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Government Plans for Transport

THERE were no unexpected announcements in the Speech from the Throne at the opening of Parliament last Tuesday. The matter of greatest interest concerning the railways is the proposed legislation to increase the borrowing powers of the British Transport Commission. This is a concomitant of the railway capital development scheme, expected to be announced shortly. The greater part of the existing borrowing powers of the Commission has already been used, and only some £22,000,000 remains to be taken up. The capital development scheme for the railways is likely to cost some £500,000,000. It is known that there is to be some additional electrification, notably in the Eastern Region suburban area, and it is widely supposed that there are plans for extensive dieselisation. It has not been stated whether the additional capital is to be raised by the issue of further British Transport Stock, which would seem the most obvious way. Items which may affect the road haulage activities of the Commission are the proposed amendments to the Road Traffic Acts. Recent debates in Parliament and speeches elsewhere suggest that the Road Traffic Bill to be published shortly may contain proposals for severe limitations on the practice of commercial vehicles of standing, for loading and unloading purposes, on the public highway. This might cause difficulties in the operation of railway collection and delivery services in towns, and also to the remaining lorries of British Road Services. The Minister of Transport & Civil Aviation, Mr. John Boyd-Carpenter, is about to issue the railways reorganisation scheme, which has received the approval of Parliament, as an Order, and now that the Government has brought this scheme into being, there is less scope than ever for Government intervention in the railways, which may now, at least for a while, enjoy that freedom from political interference which is necessary if they are to make the most of their new freedom in charging, of reorganisation, and of capital development.

Further Railway Wage Talks

ANOTHER round of railway wage negotiations is likely to start in the next few days. The National Union of Railwaymen has sent proposals to the British Transport Commission for further increases in pay for the majority of its members. This follows acceptance by the Commission, the N.U.R., and the Associated Society of Locomotive Engineers & Firemen of the award in respect of footplate wages made by the Railway Staff National Tribunal. The pressure on the leaders of the trades unions from local branches to obtain higher wages has continued, and pledges of support for strike action have been heard. The proposals now put forward by the N.U.R. are understood to be based on the original claim put forward by that union last year. Further talks between the Commission and the three railway unions on the proposed revision of the salary structure for clerical and other salaried staff have been inconclusive. A claim by the N.U.R. on behalf of the railway wages staff of the London Transport Executive, which would cost some £650,000 a year, is likely to be referred to the London Transport Railway Wages Board, which would determine the rates for the lowest and highest grades. Intermediate rates would then be settled by negotiation.

Steel Production in 1955

THE difficulties of meeting demands for certain types of finished steel are recognised by the Government and are being considered by the Iron & Steel Board. In making this announcement in the House of Commons on November 22, Mr. Selwyn Lloyd, Minister of Supply, said that total production of steel in 1954 was expected to be some 18·5 million ingot tons, compared with 17·61 million ingot tons in 1953. He forecast that the figure for 1955 would be at least 19·25 million ingot tons. This evidence of increased production will be welcome to British manufacturers of locomotives, rolling stock, and other railway equipment. Even more welcome will be the news that production of sheet steel, which has been one of the major items in which shortages have been apparent, has increased by 11 per cent in 1954 compared with 1953. The total production of sheet steel this year is expected to be some 2,000,000 tons, and no doubt it will share in the general expansion next year. Certain types of finished steel will continue to be imported in 1955, but the quantities are likely to be marginal. Plentiful supplies of steel should assist greatly in enabling manufacturers of railway material in this country to meet competition from overseas.

Modernisation of Suburban Services

THAT a modernised electric or diesel suburban railway service offers the finest transport facilities to large congested cities is claimed by Mr. J. E. M. Roberts, Chief Passenger Officer, British Transport Commission, in a paper read to the Railway Students' Association, on relations

within the passenger transport industry. He maintains that modernisation of suburban train services cannot be an economic proposition at the present level of fares, dictated by road service charges, and advocates an understanding between operators on that subject. No business undertaking, he thinks, would have underwritten the cost of the Liverpool Street-Shenfield electrification scheme if it had not known that the creation of the London Passenger Transport Board and pooling arrangements for receipts would prevent competitive road services from creaming the traffic. Steam suburban services, he says, are now marginal from the financial viewpoint, and often are run at a substantial loss and are of inadequate quality, but there is no reason why electric or diesel services, with their advantages of frequency, speed, reliability, and general attractiveness, should not completely alter the position. Mr. Roberts made an illuminating survey of passenger transport in all its forms in the course of his paper, which the recent revival of interest in Parliament and elsewhere in problems of urban transport makes of particular topical interest.

Calcutta Electrification Economics

THE all-electric main line, in contrast to the line electrified for suburban services only, often figures in new projects at the present time. In the Calcutta suburban electrification of the Eastern Railway of India, for example, main-line passenger and goods trains will be electrically-hauled between Howrah and Burdwan in the first stage of the undertaking. An advantage of this procedure, to which attention has been drawn by Mr. S. Sarangapani, Engineer-in-Chief of the project, is that with all-electric working the load factor (average demand expressed as a percentage of peak demand) should be nearly 50 per cent. If only suburban trains were worked by electricity the figure would be around 30 per cent. The importance of this to the operator is that narrowing the gap between overall and peak demands enables a more favourable tariff to be granted for the supply of power. Furthermore, with suburban trains alone the power cost per 1,000 gross ton-miles would be higher than in an all-electric scheme because of high energy consumption when accelerating from numerous stops. Mr. Sarangapani has given as typical a consumption of 62·5 kWh. per 1,000 gross ton-miles for multiple-unit stock and 22·5 kWh. for goods trains hauled by electric locomotives.

Atmosphere Pollution by Locomotives

METHODS of dealing with air pollution by smoke from steam locomotives, which are said to produce one-seventh of the smoke discharged into the atmosphere, are recommended by the Committee on Air Pollution, under the chairmanship of Sir Hugh Beaver, which published its report last week. Most of it is from shunting and stationary locomotives and occurs most frequently in those urban areas already subject to air pollution from other sources. The Beaver Committee thinks railway electrification should be accelerated and that the change from steam to diesel power for shunting should be made quickly. The British Transport Commission expects to have 800 diesel shunting engines in service by the end of 1957; this will be some 30 per cent of all shunting power then in use. The committee considers this changeover too slow, and would like to see coal-fired shunting engines replaced in all "black" areas by 1960. The Commission is urged to reduce smoke from steam locomotives as much as possible in the meantime. The law at present is largely disregarded, because it is not the duty of any particular body to enforce it. The Beaver Committee recommends that it should be an offence for a locomotive to emit dark smoke, or smoke or grit in such quantity as to cause a nuisance, except upon proof that all practicable steps were taken to prevent it; and that local authorities should have the duty of enforcing this.

Aluminium Cars for Toronto

THE Gloucester Railway Carriage & Wagon Co. Ltd. has completed the first four of six cars with aluminium body for the Toronto Subway. The decision to build the aluminium cars results from the collaboration between the Toronto Transit Commission, the builders of the rolling stock, and the Aluminium Development Association, which prepared a study of the advantages to be gained from weight saving from the operating and maintenance standpoints; the cars are going into service in the unpainted condition. Calculations based on the service timetable and loadings specified by the Commission at the time of the survey showed an annual estimated saving of some 8 per cent on energy consumption with the aluminium cars, compared with the stock of all-steel construction, based on a saving of five tons in weight, a figure on which the builders have improved. The Commission considered the potential savings of such significance as to warrant the cost of an experimental set of cars, so that comparison could be made. A feature of the aluminium stock is the exterior finish, which shows little, if any, evidence of riveting or welding. The rolling stock is described and illustrated in an article elsewhere in this issue.

Training Junior Clerical Staff

THE new school for junior clerks opened last week by British Railways, London Midland Region, at Calvert Street, Derby, represents a new development in the education of railway staff and is expected to be followed by other schools of this type. All the students are newly-joined clerks, who before entering the railway service have received secondary education. Booking, parcels and goods clerical work will be included in the curriculum, which will last four weeks. Eighteen students will attend each course. A prototype booking office has been erected in the school and as a start the students will be drawn from the Derby, Leicester, and Stoke districts. The London Midland Region hopes to extend the scheme to other centres shortly, including Manchester and London. The school should be popular with the ambitious junior largely as giving him something of a comprehensive idea of what constitutes railway clerical work, instead of leaving him to find this out by experience—and, unlike most of the self-improvement schemes and study courses already existing, this is done in normal working hours. The result in due course should be a higher general standard of clerical work; but it is doubtful whether, for the potential leader, anything is better as character training than hard study during one's spare time.

Borsig Centenary

THIS year marks the centenary of the death of a famous Continental locomotive builder, Johann Borsig. Born at Breslau in 1804, he entered the service of a machine shop in Berlin and later took charge of an associated foundry. In 1836, he founded his own works near the Oranienburg Gate. Specialising in locomotive construction, by 1851 he had delivered some 330 engines. In 1847 he started his own rolling mill in Moabit, Berlin, to produce boiler and other plate, so becoming independent of foreign supplies, and obtained customers for its products elsewhere. In 1850 the undertaking absorbed another machine shop and foundry in Moabit, and in 1854 took over a colliery in Silesia and made plans for blast furnaces. A man of liberal ideas, Johann Borsig established advanced working conditions, with sickness and provident funds. He died in July, 1854. His son Albert developed the mining and blast furnace side of the business. In 1870, the Borsig mill itself was transferred to Silesia. The space liberated was used for boiler construction and forging work and the annual output of locomotives reached 250. In 1873, the 3,000th engine left the works. Albert Borsig died in 1878, leaving the undertaking in the hands of trustees for the family, which in 1886 ceased to have any further connection with locomotive manufacture.

The End of the Victorian Railways "S" Class

THE scrapping in August of Victorian Railways 4-6-2 locomotive S.300, *Matthew Flinders,* spelled the end of a famous class which was introduced in March, 1928, when this, the first of four Pacific locomotives classified "S," was turned out of Newport Shops. The first to be scrapped was S.301, *Sir Thomas Mitchell,* in October, 1953; S.303, *C. J. Latrobe,* followed in May; and S.302, *Edward Henty,* in July, 1954. They received their names as well as high-capacity 12-wheel tenders and a streamlined sheathing when the "Spirit of Progress" was inaugurated in 1937. They were also painted royal blue with gold lines. The "S" class daily hauled this train non-stop between Melbourne and Albury, 190½ miles, in 3 hr. 50 min. northbound and 3 hr. 40 min. southbound—the fastest steam-hauled train and the longest non-stop run in Australia. They were converted to oil-burning in 1951-52. Other modifications made through the years included fitting all-steel boilers with thermic syphons, and mechanical lubricators, and altering the front end arrangements. The "Blues," as they became known after 1937, ran consistently high mileages between major overhauls, regularly up to about 80,000 miles a year. They had so captured the public imagination that many regrets were expressed that No. 300 was not retained for exhibition at the recent Victorian Railways Centenary Rolling Stock Exhibition in Melbourne.

Testing Class "5" Standard Locomotives

THE new standard mixed-traffic, British Railways class "5" locomotives are the subject of the test report No. 6, issued by the British Transport Commission, the results of which are analysed in the first of a series of articles elsewhere in this issue. As a design, the new engines follow closely the former L.M.S.R. locomotives of the same classification. The boilers of both types would seem to be alike in all major respects. The tractive force is also, for all practical purposes, the same as that of the original L.M.S.R. class "5" engines. The trials are of particular interest for the reason that they contain detailed information concerning the effect of changes made in the size of the blastpipe orifice, considered necessary to improve the rate of steam production, especially when using lower grade coal. The tests appear to indicate that the new engines will prove a useful addition to the British Railways locomotive stock both for passenger and fast freight traffic, though to what extent they are likely to be an improvement on the L.M.S.R. design is not very clear. In passenger service the locomotives can be economically used when trailing loads are 350 tons and over, while their economical working range in freight traffic is shown to be considerable.

B.T.C. (Organisation) Scheme Order, 1954

THE debates in both Houses of Parliament last week on the Draft British Transport Commission (Organisation) Scheme Order, 1954, added little to the information which had emerged from the previous discussions on the White Paper. The scheme was approved by the Commons, after a division, by 286 votes to 266; in the Lords there was no division. The one amendment to the scheme as it appeared in the White Paper has the effect of bringing the Minister of Transport & Civil Aviation into consultation with the Commission on statistical questions at the formative stage. This is intended to ensure that the statistics relating to each region, or area, provide the fullest information possible for comparative purposes.

To a comment that the Transport Consultative Committees could give information to the Chief Regional Managers on the needs of their areas, a point which we raised in an earlier article, Mr. John Boyd-Carpenter, Minister of Transport & Civil Aviation, replied that the committees did not meet at sufficiently frequent intervals to fulfil this purpose, nor could they be expected to have the regular reading of documents and the necessary contact required for a board. He did not think that the functions of area boards and consultative committees would overlap. This may, in practice, prove to be the case, but the fact remains that there will now be more than one body charged with the interpretation of local needs to the railways. He compared the new railway chain of command to the army organisation, in which authority passes from army commander to corps commander and to divisional commander, pointing out that the members of the staffs of these commanders are in touch with one another in accordance with their staff duties. This analogy will be helpful to those who are still not clear how the system will work, but those familiar with army organisation will be aware that policy on technical matters is frequently decided by the technical service concerned without reference to formation commanders.

The suggestion in the scheme that additional managerial bodies might be set up is apparently to lie dormant for the time being, but Mr. Boyd-Carpenter thought that such an authority to deal with wagon pooling arrangements might be established at some future date. An anomaly of title, comparable with that which still causes some Assistant Chief Regional Managers to be called Assistant Chief Regional Officers, is apparently to remain. Mr. Boyd-Carpenter denied that Chief Regional Managers are to be re-titled Chief Area Managers.

In the House of Lords debate a plea was made by Lord Mathers for a new sense of vocation among railway staff and a renewal of the old loyalty and devotion to the railway service. He thought that the inculcation of such a spirit would be a task for the new boards. It is in fact one of the duties of the boards as outlined in the reorganisation scheme. The news, given by the Earl of Selkirk, speaking for the Government, of a Scottish Transport Council to collate the views of all providers of transport in Scotland so as to develop a co-ordinated system of public transport in that country will be welcome to all who believe in such co-ordination, but may be difficult to reconcile with the new spirit of competition which springs from the 1953 Act.

Cutting Costs on the C.N.R.

A DECLINE in revenue this year of $60,000,000 more than last year and a net income deficit for this year of at least $25,000,000 are predicted by Mr. Donald Gordon, Chairman & President of the Canadian National Railways. A heavy annual loss in a relatively prosperous year is a reminder, Mr. Gordon told his audience, that in spite of its unique history and special place in the Canadian economy, the business future of the C.N.R. is a straightforward question of costs versus revenues. Although such a result, viewed against the efforts of the C.N.R., is a "crushing disappointment," Mr. Gordon refused to translate the verdict of this year's operations into a gloomy forecast for the future. The C.N.R. management is unshakably resolved to make its railway pay its way if human ingenuity and determination can make it profitable. It is constantly striving for the flexibility needed to maintain a successful business organisation within the requirements of stability of service. The recapitalisation plan of 1952 gave a debt structure more comparable with that of an ordinary company, and the true earning capacity of the C.N.R. was more faithfully revealed in 1952 and 1953 by a modest profit. This year's operations, however, are a reminder that the capital revision was not in itself enough to give its business future a favourable colour; like other Canadian and American railways, the C.N.R. has suffered a sharp drop in freight revenues.

The spectacular decline in freight traffic has drawn attention to the revenue side but cost factors are of equal importance. Even if the present reasonably favourable outlook for the Canadian economy in 1955 is justified by events, all indications point to a continuing, if lessening, decline in railway earnings. The C.N.R., said Mr. Gordon, will have to trim its costs even more or face another annual deficit. Its equipment and operating efficiency have never been better, but every improvement made has gone either to the staff in pay increases, which have risen 132 per cent since 1939, or to customers through the maintenance of a relatively low level of rates. The only realistic

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course is to strive to reduce labour costs per unit of output, first by technological development, and secondly, by managerial progress.

Diesel locomotives have reduced operating expenses by about $85,000,000. By 1957 this reduction may reach $145,000,000, and represent a saving of about $35,000,000 a year, or a 20 per cent return on the investment in equipment. On the managerial side, the company is pursuing a programme of rationalising channels of authority, job specification, and the relationships of one office to other offices. A new, highly mechanised personal records system will give more up-to-date information on the number and disposition of employees. One of the most encouraging features of the training, said Mr. Gordon, is the co-operation developing with the unions. The need for a professional approach to administration, both in planning and in supervision is seen.

Freight traffic is the mainstay of the C.N.R. and produces about three-quarters of the revenue. Road hauliers, whose costs are from two to five times those of the C.N.R. in proportion to distance, have been cutting into the high-rated traffic. Hire carriers moved only 9 per cent of 1952 road-rail freight, but earned 25 per cent of total road-rail freight receipts. If the railways are to survive as a healthy and solvent industry, Mr. Gordon continued, they must be able to cut freight rates on traffic vulnerable to lorry competition and strive to regain lost business. The new Montreal-Toronto freight rates are not loss rates, for they more than cover railway costs and are competitive rates. Such additional revenue obtained from rate reductions will help relieve the pressure of rising costs. The C.N.R. hopes to be better able to meet its existing wage bill out of additional revenue from traffic secured by these rate reductions, although this will not be nearly enough to offset the effects of the 1954 decline in general freight volume. "The railways still lose many millions of dollars each year by being in the passenger business," said Mr. Gordon. If they were to cut their losses they must increase their volume. The C.N.R. aims to attract more traffic with its new passenger stock costing $59,000,000 and withdraw old, unpopular rolling stock. It is changing dining car equipment and service in an effort to reduce prices and encourage patronage, and with improved schedules hopes to add to the advantages of dependability and comfort available on a good train.

September-October Traffic Trends

THE tenth four-week period of the year is marked normally by heavy carryings of freight train traffic which extend through the autumn and winter. No. 10 *Transport Statistics*, covering 28 days from September 13 to October 10, shows that British Railways originated 22,613,000 tons, 268,000 fewer than in 1953 (1·2 per cent). The result would have been worse if coal and coke forwardings of 14,101,000 tons had not been the highest in any period since March and 148,000 tons above 1953 (1·1 per cent). This increase left the originating tonnage of coal and coke during the first 40 weeks of this year short of last year's figure by 63,000 tons. That is disappointing as coal output rose by 1,281,000 tons in that time.

In the next five weeks to November 13 output dropped by 182,400 tons, so that the prospects of wiping out the deficiency in rail carryings are not too bright. It is significant that in the 40 weeks to October 10 Inland Waterways originated only 4,907,000 tons of coal class traffic, a decrease of 355,000 (6·8 per cent). The trends in rail and water transport suggest an increase in the amount of coal passing by road.

Neither can the railways count on a growth of mineral tonnage. In the four weeks to October 10 mineral tonnage fell by 194,000 tons (3·9 per cent), making the decrease over 40 weeks no less than 1,531,000 tons (3·1 per cent). More serious was the loss in four weeks of 202,000 tons of merchandise (5·2 per cent), bringing the total loss in 40 weeks to 1,153,000 tons (3·1 per cent). To October 10 the total decrease in traffic of all classes was 2,771,000 tons, or 1·3 per cent. It is disquieting to watch the diminishing volume of rail traffic when we know that industrial output has been rising at a steady rate. Based on 100 for 1948, the index for all industries in the third quarter of this year was 129 against 122 in 1953 and 112 in 1952. During this spell of unprecedented activity in general trade British Railways are not holding as large a share of the goods tonnage requiring transport as the former railway companies secured in 1937.

Net ton-miles declined in the September-October period at a higher rate than originating tonnage. Altogether British Railways worked 1,735,723,000 ton-miles, a decrease of 61,576,000, or 3·4 per cent. The Scottish Region had a small increase of 158,000 ton-miles (0·1 per cent), but the other Regions reported decreases ranging from 2,831,000 in the Eastern (0·7 per cent) to 17,901,000 in the Western (5·2 per cent) and 30,703,000 in the London Midland (4·8 per cent). The aggregate ton-mileage of 16,802,281,000 for 40 weeks was 390,566,000 below the 1953 level (2·3 per cent). The Eastern and North Eastern worked respectively 24,017,000 and 11,114,000 more ton-miles, while the Western and Scottish Regions had decreases of 3·6 per cent, and the London Midland one of 3·7 per cent. Although the Southern Region originating tonnage was 9 per cent lower, it worked only 2·5 per cent fewer ton-miles. Before the war the Southern Railway was the only main line to convey more than twice the tonnage which it originated and evidently traffic exchanged to the Southern Region still overtops the tonnage arising there. With a light train load of 125 tons the Southern works about 5·4 per cent of the freight train-miles and train-hours for British Railways.

Passenger Traffic

In the month of August 96,231,000 journeys originated on British Railways, 872,000 fewer than in August, 1953 (0·9 per cent). The decrease was the smallest in any month since April, being held down by an increase of 723,000 journeys in the Southern Region (2·1 per cent). The other Regions originated less travel at rates varying from 0·2 per cent in the Eastern to 4·2 per cent in the Western and 5·8 per cent in the North Eastern. The average receipt per journey of 33·8d. was nearly 9d. below the July average.

First class passengers in August numbered 1,535,000, an increase of 82,000 (5·7 per cent); on an average they paid a slightly higher fare of 142·6d. These happenings brought the number of passengers in the first eight months of 1954 to 657,255,000, representing a loss of 2,437,000 (0·4 per cent). The number of first class passengers rose by 103,000 (0·8 per cent) to 12,864,000. Preliminary estimates of passenger takings in September and October do not hold out much prospect of improved business in those months.

London Transport

In the four weeks to October 10 London Transport railways carried 44,562,000 passengers, an increase of 1,551,000 (3·6 per cent). London Transport road vehicles carried 273,917,000 people, 6,835,000 fewer than in 1953 (2·4 per cent). In 40 weeks to October 10 London Transport's carryings totalled 3,185,457,000, a decrease of 74,948,000 (2·3 per cent), the volume of both rail and road travel declining at that rate.

Road Transport

Road Passenger Transport, Provincial & Scottish, had a slight setback in the September-October period, losing 1,138,000 passenger journeys (0·6 per cent). The Tilling Group's carryings were down by 2,356,000 (1·8 per cent), while the Scottish Group had 1,218,000 more passengers, a rise of 2 per cent. Over 40 weeks the Scottish Group was more successful in developing new traffic, showing an increase of 10,729,000 passengers (1·8 per cent) compared with a gain by the Tilling Group of 7,050,000 journeys (0·6 per cent). The combined increases represent an advance of one per cent on 1953 and have helped to earn 1·8 per cent additional revenue in the present year amounting to £725,000.

Antofagasta (Chili) & Bolivia Railway

IN his statement accompanying the report and accounts of the Antofagasta (Chili) & Bolivia Railway Co. Ltd. for the year ended December 31, 1953, Mr. H. C. Drayton, Chairman, shows that although there was a decrease in goods and passenger traffic the net receipts from the operation of the railways for 1953 amounted to £592,530, compared with £484,334 the year before. Some of the principal results are given below:—

	1952	1953
Passenger journeys	1,077,517	891,685
Goods tonnage	1,415,509	1,287,516
	£	£
Passenger receipts	388,559	318,718
Baggage and parcels receipts	90,451	64,492
Goods and livestock receipts	4,180,148	4,071,324
Total receipts	4,949,870	4,707,386
Total working expenditure	3,621,225	3,451,676

The reduction in public goods traffic was 9 per cent. The principal decreases were in articles for the mining industry, general merchandise, Chilean products, inflammables and explosives and petroleum for Bolivian clients. There were reductions in copper bars and copper ores and in low-grade ores and tin slag from Bolivia.

The total number of passengers carried decreased, as shown above, by some 17 per cent. The number of first class passengers was lower in both Chile and Bolivia. There was also an appreciable decline in second class passenger journeys in Chile, as a result of the cessation of the special workmen's service over the short haul between Calama and Chuquicamata. Second class passenger traffic in Bolivia continued to increase.

The sum of £126,764 has been appropriated from net revenue account to renewals account, in addition to £23,236 charged direct to working expenses. The balance on renewals account at the end of 1953 was £2,014,925, compared with £1,900,836 at the end of 1952. The cost of living in Chile and Bolivia continued to increase during the year. It was necessary to grant increased wages to the company's workmen, and in July, 1953, the Chilean Government decreed a cost of living bonus to all employees and workmen. Since the 11 per cent increase in tariffs granted by the Chilean Government with effect from April 24, 1953, two more tariff increases have been granted, of 10 per cent from November 25, 1953, and 35 per cent from May 10, 1954; these increases are necessary to compensate the company for continued increased costs of wages, salaries, and materials. From June 12, 1953, the Bolivian Government authorised an increase of 115 per cent on all the company's tariffs, except minerals and metals, as compensation for the losses which the company suffered from exchange devaluation and for increased expenditure on salaries, wages and social benefits. In April, 1954, the company was obliged to meet additional substantial demands for increased salaries, wages and social benefits. On this occasion, the Bolivian Government decided that it would itself respond for that specific additional cost.

The President of Chile visited Antofagasta twice during 1953, and the opportunity was taken to bring to his notice problems affecting the railway. Until recently, an important up traffic was petroleum for Bolivia but recent developments in extraction and refining have made that country self-supporting and it has a surplus for export. Much of this new traffic will be hauled over the Oruro-Cochabamba branch and, to increase the capacity of this branch, works such as the provision of additional crossing sidings and additional train staff quarters are being undertaken. Locomotives operating in Bolivia are now using national oil fuel.

Sixteen 4-8-2 tender locomotives were ordered in 1952 from the Vulcan Foundry Limited. They have a tractive effort of 33,200 lb. at 85 per cent b.p., a total weight in working order of 146 tons and a coupled wheel diameter of 4 ft. Delivery is taking place. Also on order are three saloon-type all-steel coaches for use between La Paz and Cochabamba, where the passenger traffic is heavy, and machines for the workshops are on order. In January, 1954, a new branch to the Chile Exploration was put into service. Although the new branch is 5 km. longer than the old one, the ruling gradient has been reduced from 1 in 25 to 1 in 50, thus improving operating conditions for this important traffic. Heavy rains in March, 1953, caused some damage to the track and installations on the Chilean Section.

Mr. R. H. Dobson, Managing Director, visited the railways in Chile and Bolivia. He returned in January, having carried out a full inspection of the properties and discussed matters with the managers of both sections and with Government authorities.

Hydraulic Transmission

A DESIRABLE factor in any transmission is the high multiplication of input torque necessary to start heavy loads. Because of its functional and structural characteristics the diesel engine is unsuitable for application to direct drive, and does not respond readily to variations in mean pressure necessary to rapid changes in tractive effort. In his recent paper on hydraulic transmission for locomotives read to the Institution of Locomotive Engineers, Mr. R. H. Fett, Head of the Diesel Traction Department, the North British Locomotive Co. Ltd., has pointed out that the transmission must bridge the gap between the fast-running diesel engine, and the stationary, or relatively slow-moving road wheels, and to do so satisfactorily it must possess uniform stepless output torque. Efficiency should be reasonably high, and the equipment should be of robust construction and low in maintenance cost. It should also be a light compact unit and function automatically.

As to types of transmission, he maintains that to date, and especially for heavy duties and higher powers, the transmission most nearly approaching high-torque multiplication coupled with smooth, variable, output torque has been that of the electric drive. In his opinion, the modern Voith-North British hydraulic torque converter transmission has reached a stage of development based on years of experience where it fulfils requirements most creditably; he believes it to be a serious competitor with the established electric transmission, and stresses that the International Union (U.I.C.), in its list of standardised diesel locomotives, shows the use of both electric and hydraulic transmissions for powers of 300-2,000 h.p. No distinction is made between either, neither does the U.I.C. recommend one transmission in favour of the other.

Describing the principles, function, and characteristics of the Voith drive, Mr. Fett states that in the interests of manufacturing economy, it is desirable to limit the number of transmissions to about five for locomotives and possibly three for railcars; the former should cover up to 1,000 h.p. in a single transmission, and railcars up to about 500 h.p. Projects sometimes need special treatment in the design of suitable converters, but normally it is not, he thinks, feasible to allow for small variations in power requirements. In those conditions, therefore, it is necessary to design a particular transmission to cover a reasonably wide range of power input, yet retaining sound characteristics of torque multiplication and efficiency. He goes on to describe the details of the equipment and its functions. There is confused thinking, he says, on heat dissipation and resultant efficiency; it should be remembered that heat has to be dissipated in equal manner by the traction motors of electric transmission, and in much the same measure.

On the comparative merits of electric and hydraulic transmissions Mr. Fett considers that the horsepower at the rail is rather better for electric transmission, though not strikingly so; both drives transmit horsepower with reasonable continuity. The electric locomotive has the better starting characteristic up to a speed of about 10 m.p.h.; from then on there is nothing to choose between the two systems. With converter fluids, the selection of oil is important; it is necessary to compromise, as whatever the properties and specifications submitted on paper, the only true evaluation of the oil as a suitable fluid for converters is its use on the test bench and in service. Low viscosity is desirable, as it reduces the losses from friction and turbulence, thereby helping to maintain efficiency.

XUM

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of correspondents)

Danish Royal Saloon

November 18

SIR,—The Danish State Railways Museum seeks information on the six-wheel Royal Saloon presented to King Frederick VII by Peto, Brassey & Betts in 1854 at the opening of the Flensburg-Rendsburg line in South Slesvig. Drawings showing dimensions would be of particular interest, also descriptions of the décor and fittings. We shall be most grateful for any help that your readers can give us.

Yours faithfully,

JAMES STEFFENSEN

Signal Department, Danish State Railways

Ehlersvej 8, Hellerup, Denmark

Slackening of U.S.A. Economic Activity

November 24

SIR,—In your October 8 issue a letter under the above heading stated that the U.S.A. railways handled 77 per cent of the total commercial inter-city freight traffic in 1925 and only 55 per cent in 1952. The Interstate Commerce Commission recently announced that the railways' share dropped to 51·7 per cent in 1953. Though the total volume of traffic (including freight, mails and express) reached the record height of 1,187 million ton-miles, 4·7 per cent over 1952, the railways worked 1.5 per cent fewer ton-miles while road transport, inland waterways and oil pipe lines increased their carryings substantially; air conveyance of freight was negligible.

The rail proportion of 1954 traffic is bound to be less. During the 43 weeks to October 23, the U.S.A. railways dealt with 4,386,350 fewer wagons than in the same period of 1953, a decrease of 15·7 per cent. Week after week less-than-wagon-load traffic declined at the rate of from 8 to 10 per cent. In 1929, the number of wagons loaded with "smalls" was 13,205,700 and they carried 36,043,000 tons. In 1953 the number of wagons shrank to 3,504,000, carrying 8,255,000 tons. The Association of American Railroads has a committee investigating this serious loss of traffic, but the leakage appears to proceed faster than the search for a remedy.

Yours faithfully,

R. BELL

Frognal, N.W.3

Manufacture of Electric Traction Equipment

November 25

SIR,—Your issue of October 29 refers to a claim by the Associated Manufacturers of Electrical Equipment that technical and manufacturing resources are available for electrification of 4,000 miles of British Railways main line within the next 10 years.

Doubtless similar claims would be made by manufacturers of diesel and diesel-electric traction equipment if and when a changeover to this alternative form of traction comes under consideration.

This claim seems to show either that the Associated Manufacturers of Electrical Equipment have surplus capacity which could be taken up by the possible implementation of such an electrification scheme, or that to meet domestic requirements they are prepared to cut back on their export capacity and activities to which so much importance is rightly attached.

Electrification schemes involve broadly the design and supply of a distribution network (sub-stations, overhead lines, and so on) and motive power equipment (locomotives, motor coaches). As to motive power equipment, there is surely sufficient technical and manufacturing resources within the existing British Transport Commission organisation (consisting of 19 major works and comprising the largest manufacturing concern in the country) to design and manufacture both the electrical and mechanical equipment for locomotives and motor coaches, either electric or diesel-electric.

The manufacture of electrical and diesel electrical traction equipment within the B.T.C. organisation, although not previously undertaken, would be a logical extension of the established and existing practice of manufacturing mechanical traction equipment. This proposal, if followed, would ensure continuity of work on the design and manufacture of traction equipment within the Commission and would at the same time leave the resources of the Associated Manufacturers of Electrical Equipment available for concentrating on valuable export orders rather than devoting it to meet purely domestic needs.

Yours faithfully,

D. WILSON

54, Fernside Road, Poole

New Railways in the N.W.F.P.

November 26

SIR,—The first paragraph in the article in your November 19 issue on the newly-opened Mardan-Charsadda line of the North Western Railway of Pakistan reads: "The Mardan-Charsadda line . . . is stated to be the first railway to be built in the North West Frontier Province since the war of 1914-18." It would be interesting to know the source of this statement. May I point out that the Khyber Railway, in N.W.F.P., was opened in November, 1925?

Yours faithfully,

F. S. BOND

23, St. Andrews Park Road,
Southborough, Tunbridge Wells

[The statement referred to in our article was made to us officially. We regret having overlooked the Khyber Railway.—ED., *R.G.*]

Communication between Driver and Guard

November 28

SIR,—Mr. Thomas Walker's letter in your November 26 issue is slightly beside the main point, which is communication between driver and guard, particularly in freight trains. To this communication link would be coupled assisting engines, and perhaps also adjacent signalboxes, and perhaps stations. A direct control-to-driver link would hardly be required here.

After the novelty has worn off, reaching for the radio telephone should be no harder for the driver than operating the whistle, regulator, or reversing gear. A man taking his eyes off the road ahead for a few moments is nothing unusual. It is essential: to stare at the same thing for long periods is asking for trouble. Incidentally, guard and engine crew are supposed to exchange hand signals on certain occasions. It is advisable for one or other of the engine crew to glance back along the track. Side lights are not unknown.

If a man cannot take a message without going into a spin he should not be on the footplate. About 100 years ago a well-known engineer considered it most undesirable to employ drivers who could read!

Schemes such as I have in mind have been in normal, routine use on non-electric lines. There has been little or no mention of fading. The switch returning to the off position when released is the normal arrangement.

Yours faithfully,

COURTENAY BARRY

The Old Manor, Salisbury

THE SCRAP HEAP

Dissatisfaction Expressed

Thirty season ticket holders who missed their connection in Japan because their local train was late stood in the tracks to stop an express and went to work on it.

Men Only

The benevolent British Railways provide compartments for women only, presumably to protect them from the onslaughts of the male. . . . It is the male who requires protection from women who flounce into compartments with flashing umbrellas and swinging portmanteau-like handbags. The male, after recovering from such onslaughts, is thereafter prevented from reading his paper by the inveterate rib-digging knitter, the inane chatterer and shrieking, giggling woman. Cannot there be compartments clearly marked "Men Only"?—*From a letter to "The Daily Telegraph."*

Brighton Works a Menace to Health

Dr. George Corfe in his "Hints and a Help to Brighton Invalids" (1869), ... attacks the establishment of [the L.B.S.C.R.] works at Brighton; he believed that such factories would be injurious to the health of the town as a whole. "Railway directors" he writes, "have been suffered to smear Brighton's surface with the sooty offal of factories—30 furnace flues and numerous office chimneys may be counted, vomiting . . . their unconsumed fuel, added to which, the several locomotives, passing up and down at funereal pace, hiccough forth their black fumes. Is it not paradoxical that a town, the salubrity of which establishes the intrinsic value of railway traffic, should be thus treated by men whose commercial interests are identified with the purity of its air and the attractiveness of its coasts? Why was not a second Wolverton or Swindon erected at Shoreham or Redhill, rather than in this spot?"—*Professor E. W. Gilbert in "Brighton: Old Ocean's Bauble."*

[Professor Gilbert in the same work relates how it was originally intended to place the works of the London Brighton & South Coast Railway at Horley, on the London-Brighton main line some 26 miles from London, and describes the topographical difficulties of building and extending the works on their present site at Brighton.—ED., *R.G.*]

Spanner in the Works

A workman dropped a spanner in the works at Waterloo Undeground station and put an escalator out of action. He was carrying a box of tools in his arms on a down escalator at the Festival Hall entrance when he slipped. All his tools went flying and one small spanner jammed into the escalator's teeth.

A ticket collector at the top heard a grinding noise and applied the emergency switch. Engineers worked throughout the night to get the escalator moving again.—*From the "Daily Herald."*

The Unwanted Class

[On British and Irish Railways] the second class has disappeared; and it is the second class which deserves to disappear, if only for the stuffy atmosphere of bourgeois respectability which it will evoke so long as there are men who remember that there used to be three classes. . . . To travel second class betokened a premeditated poverty of outlook, combined with a desire to impress other travellers of, one might say, the same class. The man of property always could afford to travel wherever he wished to go in a first class carriage. The man of spirit—who happened to be a little short of cash—would prefer to travel all the way in the discomfort of a crowded third class carriage. . . . He never will feel at home in any carriage which is labelled "second class."—*From "The Irish Times."*

Lost Property

As I can't bring myself to make jokes about the plumbers' tools left behind in bus and in train, neither shall I indulge myself at the expense of doctors and their stethoscopes. But I must record that among the tools of this trade and of that, awaiting their forgetful owners in the London Transport Lost Property Office in Baker Street, is the big, black, heavy signal-lamp of a railway guard, stamped—all too apropos—L.P.T.B.—*Cyril Ray in "The Sunday Times."*

The Regimental Railways

(See the editorial article on page 536 of our November 12 issue.)

It will happen on Monday to our Porter Brown,
For letting the regiment so solidly down.
He ought to have known and raised up a salute
To his Regional boss in the mufti blue suit.

So up for court martial on Monday he goes,
His family all weeping, for everyone knows—
It's all down the street; he has broken the law,
And gravely affected the *esprit de corps.*

The court will be filled by all the big guns
(And also, of course, with the up-climbing ones)
And what then will happen, I really can't say,
But I'm sure it is jankers for many a day.

Away with the stripe he was so proud to earn,
Away goes the medal for the tips he did spurn,
Shunned by his fellows, in "glasshouse" he'll lag,
For this deep-seated insult to Guvnor and flag.

His walking-out bowler to be handed down
To next in succession for wear when in town;
His furled umbrella returned into stock;
Disgraced and demoted he'll step from the dock.

Well, maybe its right that the old martial way
Is really the best for the railways today;
But for all that is said—and you may think me barmy—
I'd rather John Elliot tackle the army.

A.C.P.

The Old Order Changeth

General Electric Company diesel-electric shunter placing in position an exhibit in the Baltimore Transportation museum. B. & O.R.R. *(See the Scrap Heap of October 29)*

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

NEW ZEALAND

Shortage of Railway Tradesmen

The Railways Department is facing serious staff shortages at its technical workshops. There are vacancies for 568 men in the nine workshops; the most serious shortage is for fitters. Difficulty is thus experienced in keeping the locomotives and rolling stock in running order.

The most seriously affected workshop is that at Hutt Valley where there are vacancies for 422 men. The Otahuhu shops are short of 118 men and the Hillside shops in the South Island of 58 men. All the principal workshops now employ considerably fewer men than in 1939. In that year the Hutt workshops employed 2,160 men, but the number today is only 975. It has been pointed out officially that this drop in figures can be discounted to some extent because the shops are not called on to do the same amount of work now as then. However, a serious shortage exists and the situation shows little sign of improvement in the near future.

Difference in wage rates between the department and private employers are recognised, not only by senior railwaymen, but by the rank and file of the railway trades unions, as the principal cause of staff shortages. The Amalgamated Society of Railway Servants has protested against Government delay in carrying out recommendations of the Royal Commission set up to inquire into the railways.

EAST AFRICA

Uganda Extension Recommended

The Uganda Development Council, set up last year under the chairmanship of the Financial Secretary, has recommended to the Government that a new line should be built in northern Uganda. The western extension from Kampala, which is at present being built, should be completed next year. The Development Council is informing the East African Railways & Harbours of its recommendation and asking the Administration to institute simultaneous rail surveys for lines from Soroti to Lira and Lira to Gulu.

Transport Advisory Council

The Transport Advisory Council has recommended a total expenditure of £420,000 on immediate development works, which include the provision of a new labour compound, three new mobile cranes, additional road transport equipment and shunting tractors for the port of Mombasa, the improvement of district office accommodation and quarters at Tanga, and the renewal of the jetty and strengthening of the causeway at Kilwa Masoko in Tanganyika. A mobile crane will be provided at Bukoba Pier and a 60-ton rail weighbridge installed at Kampala. Additional bulk oil road tank lorries were recommended to convey a growing oil traffic on the Tanganyika Road Services.

The Council considered the revised estimates of revenue and expenditure for the East African Railways & Harbours for the current year along with the draft estimates for the year 1955 which were finally recommended for submission to the Central Legislative Assembly at its meeting this month. The Council discussed the Lidbury Salaries Commission proposals as affecting the E.A.R. & H. and agreed on the terms of a draft White Paper on the matter for submission to the High Commission and the Central Legislative Assembly.

The Harbours Committee and Transport Advisory Council recommended the introduction of changes in procedure and amendments to regulations to expedite the movement of cargo through the East African ports. The Transport Advisory Council also endorsed the recommendation of the Harbours Committee that export wharfage and handling charges should be increased to meet the inescapable higher costs of operation and to cover the heavier overhead costs arising from the large-scale port improvements. The new charges will be introduced at three months notice and will take the form of separately stated wharfage and handling charges in replacement of the existing combined export charge. Details of the increases will be published shortly and it is intended that they shall take effect from March 1, 1955.

CANADA

New C.P.R. Rolling Stock and Diesels

The Canadian Pacific Railway has taken delivery of eight baggage dormitory cars, one four-section roomette car, one dome lounge sleeper car, and six duplex roomette sleeper cars, forming part of the £13,500,000 order for 15 stainless steel trains placed with the Budd Company. In addition, the company has received recently nine 1,750 h.p. and six 1,000 h.p. diesel road switchers.

Pacific Great Eastern Railway

The Minister of Railways of British Columbia, has said that the first Pacific Great Eastern train from West Vancouver to Prince George will leave on June 11, 1956. He had fixed the date for sentimental reasons: on June 11 this year he and the former finance minister, Mr. Einar Gunderson, were set up as a committee of construction for the southern and northern extensions of the line. The hour of the day had also been thought out. Government officials had agreed that a late afternoon " business men's special " would be most feasible. It would leave West Vancouver late in the afternoon and arrive at Prince George in the morning. A similar schedule would be used for a service from Prince George southward. Once heavy steel had been welded into the entire line, said the Minister, the West Vancouver-Prince George journey time would be cut from 18 to 15 hours.

New C.N.R. Hotel in Montreal

The Canadian National Railways Queen Elizabeth Hotel under construction in Montreal, will be managed by a subsidiary of the Hilton Hotel organization under a 15-year agreement. The new hotel will be 20 storeys high and have more than 1,200 rooms. It will be the largest in the British Commonwealth. The cost will be $20,000,000.

Hilton Hotels Corporation is the largest hotel organisation in the world, operating 28 hotels, including outside the Americas, the Castellana Hilton in Madrid; it has under construction hotels in Istanbul, Cairo, and Rome.

Built over the C.N.R. lines the new hotel will be built as a major unit in a 24-acre civic development larger than the Rockefeller Centre in New York. The site is midway between the shopping and financial districts of Montreal and will include the Central Station, office buildings, and the International Aviation Building.

ITALY

Reopening of Breached Line

The section between Vietri and Salerno, on the main line from Naples to Sicily, was reopened to traffic on November 10 after repair of the damage caused by the floods and landslides of the night of October 25-26. During the period of interruption, trains were diverted via Mercato San Severina, rejoining their normal route at Salerno. The diversion added from two to three hours to the journey time to Sicily.

HUNGARY

Danube Bridge Restored

The frontier bridge over the Danube at Komárom which has been rebuilt by Hungary and Czechoslovakia jointly, was completed on November 15.

The original bridge was destroyed by the Germans in 1944 and rebuilding was delayed because of technical difficulties, as even the underwater pillars had been destroyed or severely damaged. Removal of the wreckage began in 1952, and was followed by the rebuilding of the pillars. The new supporting pillars are 120 ft. high, of which 85 ft. is below water. The bridge is 625 yd. long and weighs 2,500 tons.

British Railways Class "5" Locomotive Tests—1

Cylinder and boiler performance during stationary plant and road tests

By E. C. Poultney, M.I.Loco.E.

IN continuation of extensive investigations concerning the performance of steam locomotives, a series of tests has now been concluded with the new British Railways standard class "5" mixed-traffic, 4-6-0 type fully described in Bulletin No. 6 recently issued by the British Transport Commission. The class "5" engines are the second of the standard types to be completed and were first placed in traffic in the early part of 1951.

In general, the design, prepared under the supervision of R. A. Riddles, Member for Mechanical & Electrical Engineering of the former Railway Executive, follows closely those of the same type and power classification built for the L.M.S.R. according to the designs of Sir William Stanier, and first introduced in 1934. Taking into consideration the close similarity existing between the original and the new standard locomotives, it may be of interest to make a short reference to the former engines, large numbers of which have been and still are successfully used in general services, principally on the London, Midland, and the Scottish Regions of British Railways.

Modified Boilers

Since first built, the L.M.S.R. class "5" engines have been modified in certain respects, chiefly in the size of the boilers fitted, which, though conforming to the original basic design of the Belpaire pattern in conjunction with a tapered rear barrel course, have undergone changes in the size of the firebox and in the extent and disposition of the heating surfaces. Table No. 1 gives particulars of the successive changes made between 1934 and 1948, and includes for comparison the corresponding dimensions of the new standard design.

The chief modifications made to the original L.M.S.R. class "5" locomotives involved the provision of a larger firebox and alterations in the size of the superheaters fitted, the number of sets of elements being increased from 14 to 24 and, finally, to 28 for the latest built. Of the engines first constructed in 1948, a certain amount of re-designing took place, the boiler centre being raised and the engine wheel base lengthened, the latter being, apparently, in consequence of the fitting of roller-bearing journal boxes to all the engine and tender axles in the case of ten locomotives, which were also equipped with Caprotti valve gear; a further ten were also fitted with this valve gear, but had standard plain bearing axleboxes.

A further engine built was experimentally fitted with an outside design of Stephensons valve gear as opposed to Walschaerts gear, used as standard. At a later date two more engines were turned out, fitted with a revised design of Caprotti valve gear, incorporating an outside duplex drive for the camshafts. The original L.M.S.R. class "5" locomotives, as most recently built, were the subject of a comprehensive article in *The Railway Gazette* of October 27, 1939, which also gave some particulars of the working of these engines. The later developments of 1948 were the subject of a further article in *The Railway Gazette* of February 20, 1948.

Up to the present the performance of the original L.M.S.R. or later class "5" engines has not been the subject of a test report bulletin; however, some particulars of the performance of one of the original L.M.S.R. class "5" engines (28 element series) were included in a paper, "Locomotive Testing on British Railways," by D. R. Carling, M.A., published in Journal 217 of the Institution of Locomotive Engineers, 1950. Two engines of the 28 element series, Nos. 45253 and 44973, took part in the locomotive interchange trials, in 1948.

Comparison of Class "5" Designs

Referring to the new standard engines, the following particulars should be noted. In the first place, the boilers are, as will be seen from the dimensions in table No. 1, practically duplicates of those used for the later L.M.S.R. design, having 28 sets of superheater elements. There are 151 tubes, $1\frac{7}{8}$ in. dia. outside, and 28, $5\frac{1}{8}$ in. dia. flues, the length between the tubeplates being 13 ft. $2\frac{7}{8}$ in. The superheater elements are $1\frac{3}{8}$ in. dia. outside. The free area through the tubes and flues is 2·22 and 2·33 sq. ft. respectively, and the total of 4·55 sq. ft. is equal to 15·9 per cent of the grate area.

The superheater heating surfaces are rather more than for the later L.M.S.R. class "5," the area being 369 sq. ft., or 18·27 per cent of the combined heating surface, as against 348 sq. ft., equal to 17·46 per cent of the combined heating surfaces. The chief differences in the two designs are the size of the cylinders and piston valves, as set out in Table 2, and in the diameter of the coupled wheels, which are increased from 72 to 74 in., so conforming with the size adopted for the standard Pacific type locomotives, British Railways classes "6" and "7," as well as the E. & N.E.R. "V2.", "A2." and "B1." classes and the S.R. "Merchant Navy" Pacifics.

The revised cylinder and driving wheel dimensions with the working steam pressure of 225 lb. per sq. in. gives the British Railways class "5" a rated tractive force of 26,120 lb. com-

TABLE 1—PRINCIPAL DIMENSIONS 4-6-0 CLASS 5 M.T. LOCOMOTIVES

Number	1	2	3	4	5	6
Engine class	L.M.S. cl. "5"	L.M.S. cl. "5"	L.M.S. cl. "5"	L.M.S. cl. "5"	L.M.S. cl. "5"	B.R. cl. "5"
Cylinders, dia. and stroke, in.	18½ × 28	18½ × 28	18½ × 28	18½ × 28	18½ × 28	19 × 28
Driving wheels, dia., in.	72	72	72	72	72	74
Boiler steam pressure, lb. per sq. in.	225	225	225	225	225	225
Rated tractive force, lb.	25,455	25,455	25,455	25,455	25,455	26,120
Heating surfaces, sq. ft.—						
Tubes and flues	1,460	1,460	14,479	1,479	1,479	1,479
Firebox	156	171·3	171	171	171	171
Evaporative	1,616	1,631·3	1,650	1,650	1,650	1,650
Superheater, elements, 14 sets	227·5	—	—	—	—	—
,, 24 ,,	—	307	—	—	—	—
,, 28 ,,	—	—	359	348	348	369
Combined	1,843·5	1,938·3	2,009	1,998	1,998	2,019
Grate area, sq. ft.	27·8	28·65	28·65	28·65	28·65	28·7
Weight, tons						
On driving wheels	54	53·15	54·25	56·1	57·3	58·05
Engine	72	70·6	72·1	74	75·3	76
Wheel base, ft.-in.—						
Coupled wheels	15	15	15	15-4	15-4	15-6
Engine	27-2	27-2	27-2	27-6	27-6	27-3
Ratios—						
Adhesive factor	4·77	4·75	4·80	4·94	5·01	4·97
Tractive force/grate area	915	888	888	888	888	910
Tractive force × dia. of drivers, in. ÷ Evap. heat. surface	1,131	1,123	1,110	1,110	1,110	1,171

Loco. No. 1. As originally built 1934. Some of the original boilers were later fitted with 21 element superheaters. Heating surfaces. Tubes and flues 1,425·8 sq. ft. Firebox 155 sq. ft. Superheater 256·2 sq. ft. Total 1,837·0 sq. ft.
,, No. 2. As built 1936.
,, No. 4. Roller bearings all axles. Caprotti valve gear. } 1948
,, No. 5. ,, ,, ,, Piston valves }

TABLE 2—CYLINDERS AND VALVES

L.M.S. class "5" and B.R. class "5" Locomotives

Locomotive	L.M.S. class "5"	B.R. class "5"
Cylinders, dia. and stroke, in.	18½ × 28	19 × 28
Clearance volume, per cent	9·5	11·3
Valve gear	Walschaerts	Walschaerts
Valves, piston dia., in.	10	11
,, maximum travel, in.	6⅛	7⅛
,, lead, in.	¼	¼
,, steam lap, in.	1⅛	1 1/16
,, exhaust	1/16 in. exh. clearance	Line and line
Maximum cut-off per cent	74	76

pared with 25,455 lb. for the L.M.S.R. locomotives. Like the former engines, the adhesive factor of 4·97 is ample for all conditions. The standard engines have two different tenders according to requirements, each having a coal space for seven tons, but with tank capacities of 4,250 or 5,000 gallons. These are classified B.R.1., and B.R.1.A., respectively, and have loaded weights of 49·15 and 52·5 tons. The locomotive weights are 125·15 and 128·5 tons.

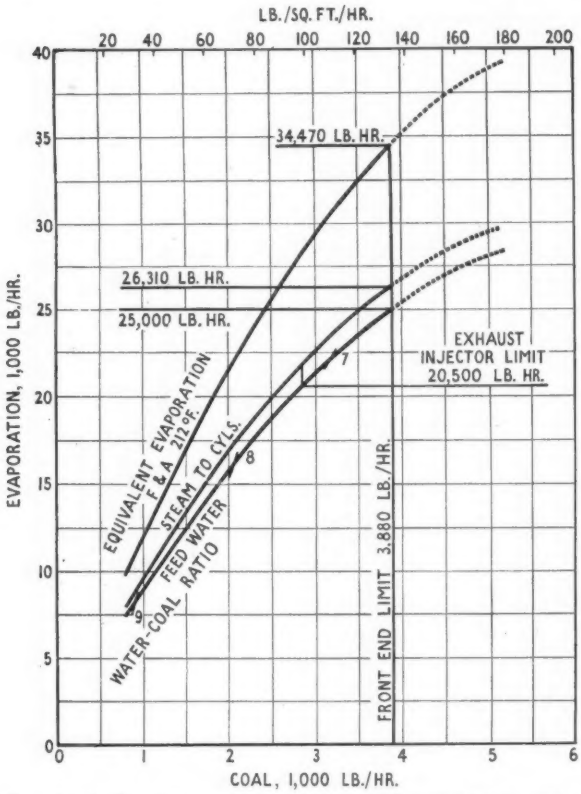
The purpose of this class is to provide a locomotive with a wide range of availability which would eventually take the place of the original series of tests carried out at the Rugby testing station in the first instance, followed by controlled road tests conducted between Carlisle and Skipton L.M.R., using the L.M.R. No. 1 dynamometer car. All these tests were carried out with locomotive No. 73008, which was prepared for testing during building, and were made with the engine as first designed. The trials were conducted at intervals between August, 1951, and March, 1952.

In addition to the usual complete data characteristic of these test reports, the present bulletin includes a supplement, dated November, 1953, the purpose of which is to show the effect of certain changes found necessary to provide the required power output when using Blidworth and similar coal.

This will be discussed later, but, in connection with these modifications, it is desirable to draw attention to certain features of the design as built and as tested on the plant and on the road. The particular features of the class "5" standard engines as designed are as follow:—

Blast pipe nozzle dia. 5⅛ in.
Hulson grates. Air space 32·6 per cent
Self-cleaning front end
Exhaust steam injector, 20,500 lb. per hr.
Front and rear dampers fitted to the ashpan

The supplementary tests were carried out at the Rugby Testing Station during the summer of 1953 with class "5" standard engine No. 73030. For these tests it is important to note that the live steam injector only was used. The tests on the plant at Rugby were conducted at different constant rates of evaporation and combustion and at constant selected speeds. Coal and water rates were determined by the summation of increments method. Tests were made when using the live steam injector for boiler feed only, the exhaust steam injector only, and both injectors. The results shown in the present bulletin refer to those made when the exhaust steam injector was used up to the limit of its capacity, above which the live steam was used, with the exhaust steam injector.



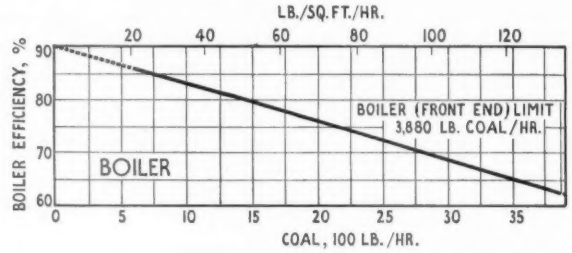

LB./SQ.FT./HR.
20 40 60 80 100 120
BOILER EFFICIENCY, %
90 80 70 60
BOILER
BOILER (FRONT END) LIMIT 3,880 LB. COAL/HR.
0 5 10 15 20 25 30 35
COAL, 100 LB./HR.

Fig. 2—Boiler efficiency over the same range of working, using South Kirkby coal

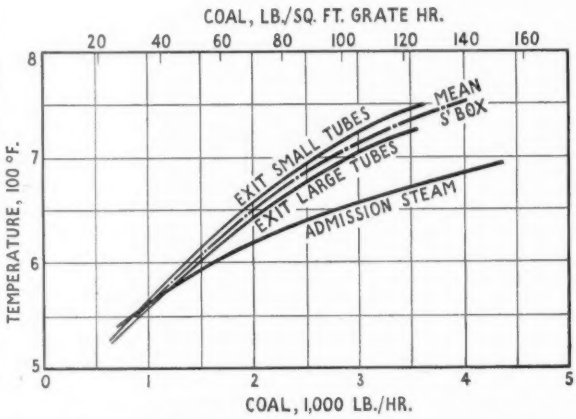

COAL, LB./SQ. FT. GRATE HR.
20 40 60 80 100 120 140 160
TEMPERATURE, 100 °F.
8 7 6 5
MEAN S' BOX
EXIT SMALL TUBES
EXIT LARGE TUBES
ADMISSION STEAM
0 1 2 3 4 5
COAL, 1,000 LB./HR.

Fig. 1—(left) Evaporation up to maximum firing rates; Fig. 3 (right)—Smokebox gas and admission steam temperatures, using South Kirkby coal in both cases

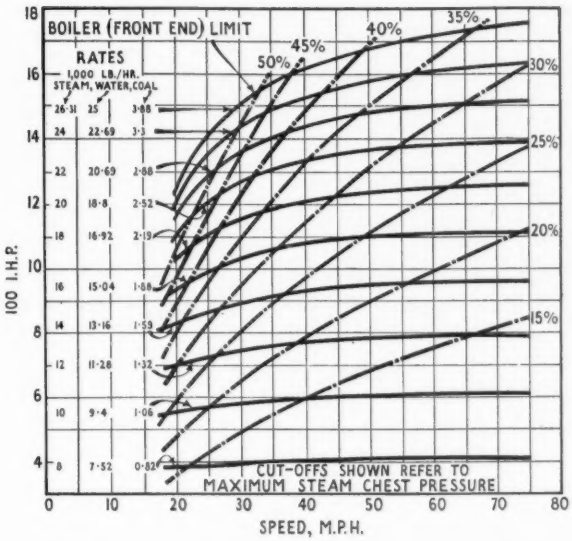
L.M.S.R. class "5," the former L.N.E.R. class "B.1." and the former G.W.R. "Hall" classes, all of the 4-6-0 type. From the standpoint of design, the aim has been to provide an easy accessibility of the various component parts, thus facilitating preparation and maintenance, particularly at Motive Power Depots.

Testing Procedure

The test report bulletin, while generally similar to those previously issued in so far as the method followed in presenting the results obtained, differs in one important respect in that the data referring to the performance of the locomotive when the fuel used was Blidworth coal do not fully represent the capacity of the engines as now in service. The bulletin is based on a

The speed range covered was from 15 to 75m.p.h., from 15 to 60 per cent cut-off and from 8,000 to 25,000 lb. of feed water per hr. Full regulator opening was used for the majority of the tests. Tests on the plant ranged generally from 90 to 140 min. duration and, in all, the equivalent of 9,120 miles was run. Indicating was carried out with a modified Farnboro' indicator, and comparative tests have been made when using the latest pattern of Dobbie McInnes type of piston indicator.

The mileage covered during the tests on the road came to about 2,800 miles at various constant steaming rates. The Swindon steam flow indicator, as previously used, was employed to ensure constant rates of steaming, and the controlled firing technique followed during the plant tests was again used



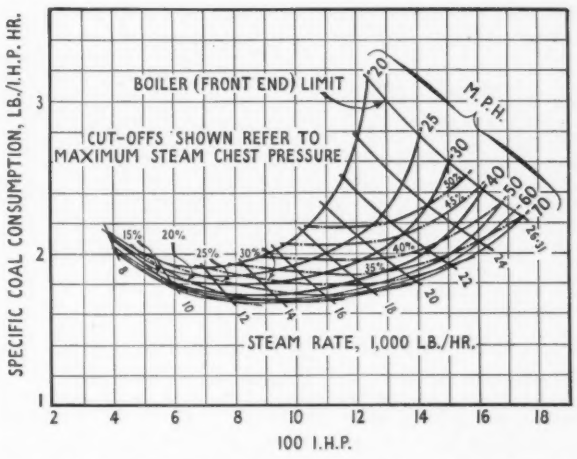


Fig. 4 (left)—Indicated characteristics; Fig. 5 (above)—Coa consumption, lb./i.h.p.; South Kirkby coal was used for the tests in each case

to govern combustion rates. The boiler performance established on the plant was reproduced and fuel and water consumptions were related to the work done at the drawbar without difficulty.

Compared with the plant experiments, road speeds were slightly less and cut-offs rather greater. At the higher rates of steaming and power output, use was made of one or two of the L.M.R. mobile testing units, as required, to add to the normal resistance of the train in order to avoid excessive speeds, thus following the plan adopted when the British Railways class "7" Pacific engine was tested over the same road, and as described in *The Railway Gazette*, September 11 and 25, and October 16, 1953, issues.

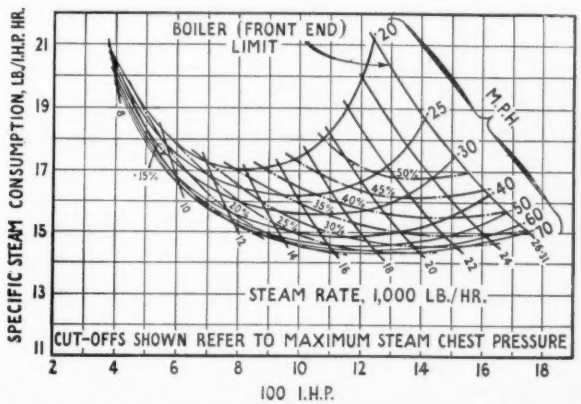
As with all previous locomotive tests, the coal used was of different qualities and in the present instance those used were Blidworth and South Kirkby coals; both these have been employed previously, thus making it possible to compare the results of trials made with other locomotives. The Blidworth coal had a calorific value of 12,600 B.Th.U. per lb. "as received," and 13,710 B.Th.U. "dry," the evaporative values being 12·99 and 14·13 lb. of water "From and At" 212° F. per lb. of coal.

For the South Kirkby coal, the respective calorific values "as received" and "dry" were 13,700 and 14,303 B.Th.U. per lb., corresponding to evaporative values of 14·12 and 14·73 lb. of water "from and at" 212° F. per lb. of coal. The evaporated value of the South Kirkby coal "as received" and as fired is, therefore, about 8·5 per cent higher than the Blidworth fuel.

Some observations on the boiler performance when using South Kirkby and Blidworth coal are summarised, thus: when the former coal was fired, the maximum sustained feed evaporation was 25,000 lb. of water per hr., corresponding to a steam feed to the cylinders of 26,310 lb. per hr., including the exhaust steam injector. The rate of firing was 3,884 lb. of coal per hr., and is the limit set by the available draught. It is also said to be the limit for one fireman and to cover the range of economical working.

With Blidworth coal at normal rates of working, combustion and steaming were also stated to be satisfactory, though, after an actual evaporation on the Rugby plant of 18,000 lb. of water per hr., equal to a steam feed to the cylinders of 19,150 lb. per hr., taking the exhaust steam injector into account, there was an indication that the limit of satisfactory combustion had been reached. This rate of evaporation was considered to be lower than expected from this size of boiler, and the supply of primary air to the grate was thought to require some investigation for these specific conditions.

The cylinders gave good indicator diagrams for any steam rate the boiler could supply and at a cylinder feed of 26,310 lb. of steam per hr., corresponding to an hourly rate of evaporation of 25,630 lb. per hr., 1,530 i.h.p. was developed at 50 per cent cut-off at 33 m.p.h. the steam rate then being 16·75 lb. per i.h.p. hr. The lowest specific consumption was 14·3 lb. per i.h.p. hr., when the power developed was 1,256 i.h.p. at 25 per cent cut-off and 70 m.p.h. or 318 r.p.m. At this power output, the steam rate (cylinder feed) was 18,000 lb. per hr. and the cylinder efficiency, based on


BOILER (FRONT END) LIMIT
M.P.H.
STEAM RATE, 1,000 LB./HR.
CUT-OFFS SHOWN REFER TO MAXIMUM STEAM CHEST PRESSURE
SPECIFIC STEAM CONSUMPTION, LB./I.H.P. HR.
100 I.H.P.

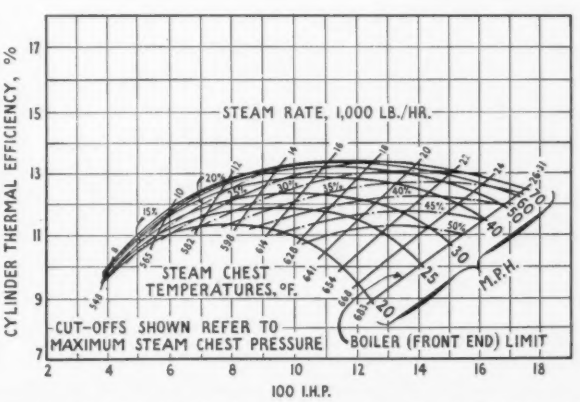


Fig. 6—(left) Steam consumption lb./i.h.p.; Fig 7 (right)—Thermal efficiency of cylinder per cent, using South Kirkby coal in both cases

XUM

the heat in the steam as supplied to the engines above 32° F. equalled 13·35 per cent.

Stationary Plant Tests

When using South Kirkby coal, the maximum rate of evaporation reached was 25,000 lb. of water per hr., corresponding to an equivalent evaporation of 34,470 lb. per hr. and to a firing rate of 3,880 lb. or 135·4 per sq. ft. of grate area per hr. This is the maximum rate of working and marked the limit set by the front end with a blastpipe nozzle of 5⅛ in. dia. Including the exhaust steam injector, the rate of cylinder feed steam delivered per hr. was 26,310 lb., having a temperature of 683° F. The evaporations attained at firing rates, varying from 875 lb. per hr. up to the maximum, are shown in Fig. 1, and the maximum power shown by this plot is as much as 1,760 i.h.p. at 75 m.p.h., or 342 r.p.m. at coal and steam rates of 3,880 and 26,310 lb. per hr. The consumptions are then 2·2 and 15 lb. of coal and steam per i.h.p. hr.

Assuming a medium firing rate of about 2,000 lb. of coal per hr., the diagrams show that for an actual rate of firing equal to 2,190 lb. of coal per hr., the constant cylinder feed is 18,000 lb. of steam per hr., giving powers ranging from 1,100 to 1,250 i.h.p. when speeds are from 25 to 62 m.p.h., and at cut-offs of about 42 per cent, to a minimum of 25 per cent at 62 m.p.h. The specific coal and steam consumptions per i.h.p. hr. are illustrated by Figs. 5 and 6.

The cylinder conversion efficiencies, based on the enthalpy of the cylinder feed steam above 32° F., are shown by Fig. 7. It will be noted that at maximum speeds, m.p.h., and at steam rates from 14,000 to 22,000 lb. per hr. the efficiency is 13 per cent or a little more.

In addition to showing the cylinder efficiencies at different rates of power output, the steaming rates are also included, as are also the corresponding temperatures of the cylinder feed steam.

Combined Efficiencies

The efficiencies of the boiler and engines combined, which is the thermal efficiency of the power plant, being based on the power developed in the cylinders, extend over a wide range of from seven to 11 per cent according to the rate of working. The minimum is seven per cent, at the maximum rate of firing, and when the powers developed extend from 1,230 to 1,765 at 20 and 75 m.p.h.

The highest efficiency is 11 per cent, obtainable over a limited range of power output at speeds from 48 to 75 m.p.h. and firing rates from 1,880 and 1,320 lb. of coal per hr. These rates of firing correspond respectively to cylinder powers from about 900 to 1,100 i.h.p. and 700 to 800 i.h.p. over a speed range of 20 to 75 m.p.h. If it is taken that a constant firing rate of 2,190 lb. of coal per hr. is representative of normal maximum rates of working, the following efficiencies would obtain:—

M.p.h.	Ind. T.F.	I.h.p.	Efficiency
22·5	17,900	1,075	9 per cent
26	16,000	1,115	9·5 ,, ,,
34	13,100	1,185	10 ,, ,,
50	9,300	1,235	10·5 ,, ,,
60	7,800	1,255	10·6 ,, ,,
70	6,750	1,260	10·6 ,, ,,

The powers available at the drawbar on a level tangent track are given by Figs. 8, and 9, and relate to speeds of from 20 to 70 m.p.h. and the Figs. 10, and 11, show the coal and water rates per d.b.h.p. hr. The contour lines plotted in Fig. 8, giving the drawbar

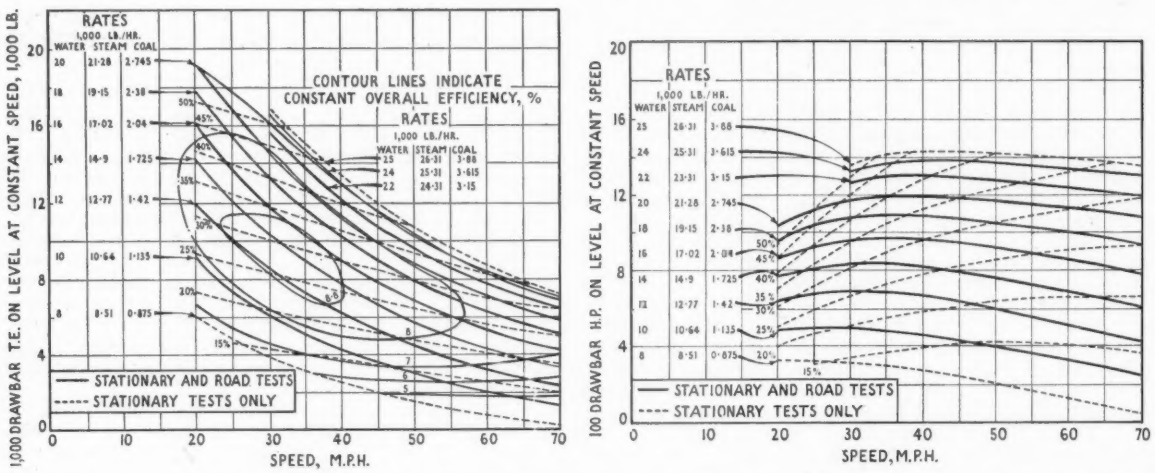

1,000 DRAWBAR T.E. ON LEVEL AT CONSTANT SPEED, 1,000 LB.
SPEED, M.P.H.
CONTOUR LINES INDICATE CONSTANT OVERALL EFFICIENCY, %
RATES 1,000 LB./HR. WATER STEAM COAL
STATIONARY AND ROAD TESTS
STATIONARY TESTS ONLY
100 DRAWBAR H.P. ON LEVEL AT CONSTANT SPEED
SPEED, M.P.H.

Fig. 8—(left) Drawbar tractive effort on level track at constant speed; Fig. 9 (right)—Drawbar h.p. on level track at constant speed; South Kirkby coal was used in each case

boiler efficiency over the same range of working are given in Fig. 2.

Smokebox gas temperatures, and also the temperatures of the cylinder feed steam in relation to firing rates are given in Fig. 3, from which it will be observed that at maximum rates of firing, the smokebox gas temperature was 750° F.; however, at medium firing rates of about 2,000 lb. of coal per hr. producing from about 950 to a little below 900 d.b.h.p. at normal speeds of 30 to 55 m.p.h. the front end gas temperatures are somewhat less than 650° F. The shape of the firebox used, having a rather steeply sloping throat plate, restricts the length of the barrel portion and, therefore, the tubes, so that somewhat high front end gas temperatures are unavoidable, more especially, of course, at the higher rates of firing and power output.

The powers developed in the cylinders are shown in Fig. 4 for actual evaporations, from a minimum of 7,520 to the maximum of 25,000 lb. of water per hr., corresponding to cylinder feeds varying from 8,000 to 26,310 lb. of steam per hr. The range of cut-offs varies between 15 and 50 per cent. The pull characteristics denote the thermal efficiencies, based on the drawbar horsepower, or, in other words, the overall efficiencies of the locomotive. Through a considerable range of working, these tests show that locomotive efficiencies of eight per cent or over may be expected.

When the locomotive was tested on the Rugby plant, the maximum actual evaporation when using Blidworth coal was 18,000 lb. of water per hr., corresponding to a steam supply to the cylinders of 19,150 lb. per hr., allowing for the exhaust steam injector. The equivalent evaporation at this rate of actual evaporation was 24,750 lb. of water per hr.

The rate of firing, which marked the front end limit, was 2,630 lb. of coal per hr., equal to a firing rate of 91·5 lb. of coal per sq. ft. of grate area per hr. On the Rugby plant, this rate of evaporation produced a maximum of 1,340 i.h.p. at 25 per cent cut-off, and a speed of 70 m.p.h. The corresponding power available at the drawbar on a level tangent track was about 950 h.p., which is equal to a drawbar pull of 5,100 lb.

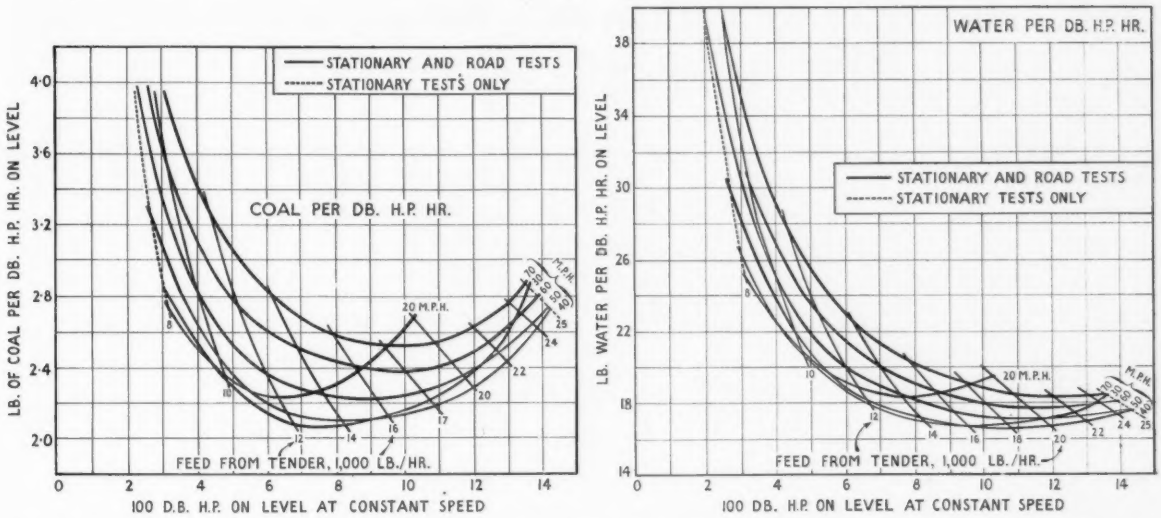

STATIONARY AND ROAD TESTS
STATIONARY TESTS ONLY
COAL PER DB. H.P. HR.
LB. OF COAL PER DB. H.P. HR. ON LEVEL
FEED FROM TENDER, 1,000 LB./HR.
100 D.B. H.P. ON LEVEL AT CONSTANT SPEED
WATER PER DB. H.P. HR.
LB. WATER PER DB. H.P. HR. ON LEVEL
STATIONARY AND ROAD TESTS
STATIONARY TESTS ONLY
FEED FROM TENDER, 1,000 LB./HR.
100 DB. H.P. ON LEVEL AT CONSTANT SPEED

Fig. 10 (*left*)—*Coal consumption, d.b. h.p. hr. on level track ; Fig.* 11) (*right*)—*Water consumption per lb. h.p. hr. on level track, using South Kirkby coal in both cases*

The foregoing maximum rates of power output relate to the locomotive as designed with a blastpipe having a 5⅛ in. dia. nozzle and other details as already mentioned. The evaporation and power output were, it will be observed, very considerably less than those obtained with South Kirkby coal.

(*To be continued*)

Shunting Locomotives for Steelworks

Saddle-tank saturated 0-6-0 *type engines of* 29,662 *lb. and* 20,000 *lb. tractive effort*

AMONG the locomotives recently delivered by Robert Stephenson & Hawthorns Limited, Newcastle-on-Tyne are four 4-ft. 8½-in. gauge saturated saddle-tank engines for the Ebbw Vale Works of Richard Thomas & Baldwins Limited. The locomotives are of the 0-6-0 type, two of which are fitted with 18½ in. dia. by 26 in. stroke cylinders, and two with 16 in. dia. by 24 in. cylinders. The tractive efforts are 29,662 lb. and 20,000 lb. respectively. The first-mentioned two engines have been specially designed for gradients of 1 in 22 with a miniimum curve of 300 ft. radius with a load of 150 tons. The total rise is 680 ft. in a distance of nine miles. The principal dimensions of the locomotives are as follows:—

Cylinders (2)	18½ in. dia. × 26 in. stroke
Wheels, diameter ..	4 ft. 3 in.
Wheelbase	12 ft.
Boiler pressure ..	200 lb./sq. in.
Tractive effort	29,662 lb.
Tank capacity	1,650 gal.
Coal capacity	1·78 tons

Cylinders (2)	16 in. dia. × 24 in. stroke
Wheels, diameter ..	3 ft. 11 in.
Wheelbase	11 ft.
Boiler pressure ..	180 lb./sq. in.
Tractive effort	20,000 lb.
Tank capacity	1,100 gal.
Coal capacity	1·6 tons

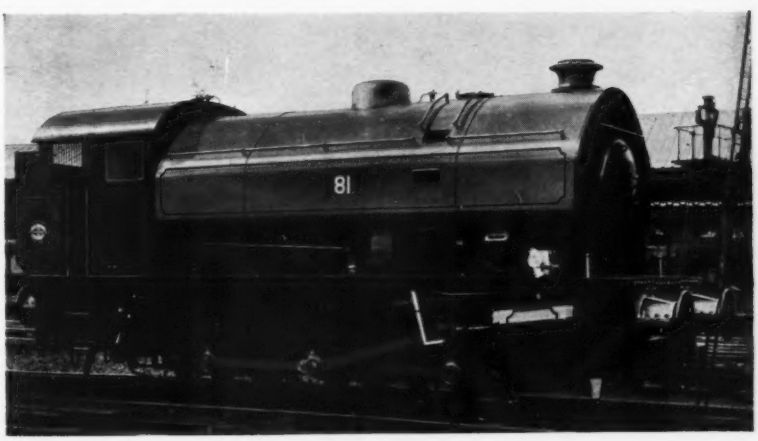
Both types of locomotives are generally similar in construction. The boilers are fitted with a copper firebox and steel tubes, the mountings include a steam stand with shut-off valve, Gresham & Craven RSC class injectors mounted below the footplate, and Ross pop safety valves.

Asbestos mattresses are fitted The ashpan is of the partial hopper type with bottom sliding door operated from the cab, as are also the rocking bars and drop grate.

The piston rods, slidebars, crankpins, valve spindles, and motion pins are of Nitralloy steel. Manganese steel liners are fitted to the axleboxes and guides. Cylinders are fitted with pressure relief valves, and balanced slide valves, the valve gear is of the Stephenson type. Piston and valve rod glands are fitted with United States metallic packing.

Lubrication of cylinders, steam chests, slidebars, axleboxes, and steam brake cylinder is by one 12-feed and one 6-feed Wakefield mechanical lubricator.

The two 16-in. cylinder locomotives are an addition to engines of the same design previously supplied, and which were built at the Darlington Works of Robert Stephenson & Hawthorns Limited.



Saturated saddle tank 0–6–0 *locomotive built by Robert Stephenson & Hawthorns Limited*

XUM

Reconstruction of Up Side Building at Grays

Combined booking hall and waiting room : use of in situ prestressed concrete for roof and platform awning

General view, showing awning of in situ prestressed concrete

WORK has been completed by British Railways, Eastern Region, on the reconstruction of the up side station building at Grays, on the Barking to Tilbury line of the L.T.S. section, at a cost of nearly £30,000. Included in the scheme are new booking office and waiting room facilities, new staff rooms, parcels office, public inquiry office, toilets, and cycle store.

Except for the combined booking hall and waiting room, interior walls and ceilings generally are plastered and painted with emulsion paint and the whole building is heated throughout by electricity.

The roof of the building and the platform awning are of *in situ* prestressed concrete, the awning being 145 ft. long with a cantilever of 17 ft. The method of construction used was to cast a vibrated slab of 5 in. maximum thickness in which 1¼ in. × 2¼ in. grooves were formed at 9 ft centres. The prestressing wires were placed in the grooves, tensioned by the Magnel Blaton system, and grouted in. The slab was cast in three sections, the largest being 90 ft. × 57 ft.

The roof is supported partly by ordinary reinforced concrete columns and beams and partly by load-bearing brick walls, on the principle that the roof spans over two parallel supports and the effect of the cantilevers is to produce a negative bending moment over the whole of the slab.

Externally, the walls are faced with yellow kiln stocks, pointed in cream cement lime mortar, with panels of dove grey faience tiling and poster spaces with yellow tiled surrounds. Doors generally are in oiled teak except those in metal screens, which are pressed metal, painted. All exposed concrete surfaces are painted in stone paint. The roof is covered with three-layer built-up roofing felt finished with Bridport grit.

Booking Hall and Waiting Room

The principal public space in the new building is the combined booking hall and waiting room. This is arranged with the ticket control at the doors to the platform and the ticket issue windows to the left of passengers entering the station. On the other side of the room is the waiting area and bookstall. The waiting area is defined by a variation in floor and ceiling patterns.

Dark green Terrazzo tiles are used for the whole floor, with a white pattern introduced into the waiting area. The walls are partly panelled in strip Niove and the ceiling is in acoustic tiles. The waiting area is equipped with plastic surfaced, moulded plywood bench seats.

New electric lighting with modern fittings has been installed throughout, and new enamelled direction signs and name tablets have been provided.

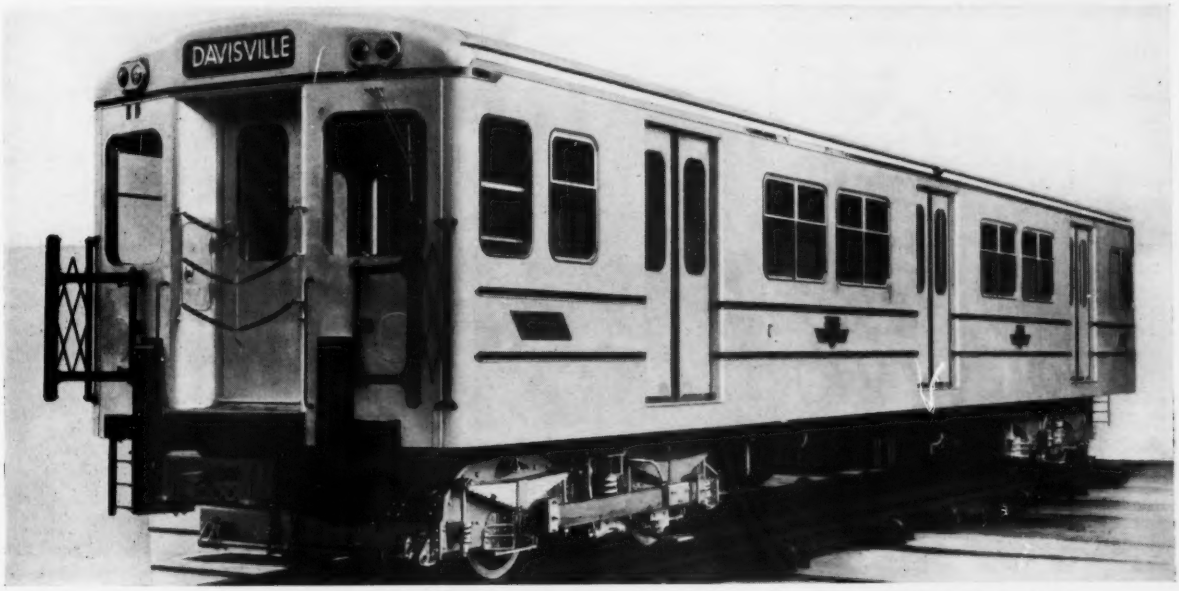
(Left) Exterior walls faced with yellow kiln stocks; (right) entrance from street into combined booking hall and waiting room, showing acoustic tiles in ceiling

Aluminium Cars for Toronto Transit Commission

A weight saving of approximately 5½ tons has been achieved, which, when based on the bodyshell of steel cars shows a reduction of 50 per cent

DETAILS of the Toronto subway cars of all-steel construction, built by the Gloucester Railway Carriage & Wagon Co. Ltd., were given in our issue of January 8, 1954. Mention was then made that the Toronto Transit Commission had ordered from the Company four cars, since increased to six, to be built in light alloy, so that a full comparison could be made of the performance of six-car trains in steel and aluminium; the first cars are completed and ready for shipment.

The decision of the Commission to order a number of aluminium cars, was the outcome of an intensive study in collaboration with the builders and the Aluminium Development Association, into the economic advantages of light-alloy stock for the new subway service.



Toronto subway aluminium car built by the Gloucester Railway Carriage & Wagon Co. Ltd.

General Design

The aluminium cars are of the same dimensions as the steel cars and both are alike in the disposition of lights and doors. The interiors are identical in arrangement and finish. In contrast with the steel cars, however, the exterior finish of the aluminium car bodies is unpainted and relief is given to the flush surface by decorative mouldings and crests.

The entire bodyshell, including the underframe, bodysides, ends and roof, are in aluminium with the single exception of the underframe bolsters. In the restricted space available and with the small permissible deflection on a wide underframe, the low elastic modulus of aluminium would tend to reduce the degree of weight saving and the bolsters were therefore made in steel. To achieve the best economy in the construction of a small number of cars, the design of the body structure was developed to include a considerable number of standard or standardised light-metal sections. Where large quantity production is undertaken it may be more advantageous to take advantage of the flexibility of the extrusion process to a fuller extent, by using sections specially designed for these functions. In all, only five special sections were used and of these, three were of simple commonly used, structural forms.

The Toronto cars are equipped with six double-entrance doors in the bodysides to permit rapid ingress and egress of passengers, and the underframe bolsters are located within the outer doorway openings. A forced ventilation and heating system of adequate capacity to ensure comfort under the considerable range of ambient temperatures, made it necessary to incorporate air ducts of large cross-section in the bodysides. This disposition of entrances in a bodyshell of integral construction induces large bending moments in the region of the doorways, particularly at the junction between the top rails and door pillars.

The large openings in the cantrail made necessary by the ventilation system, are situated at these joints and interesting use is made of high-strength aluminium castings to provide structural strength. However, it has been possible by changing from steel to light alloy construction to save nearly 5½ tons per car, which represents a saving of more than half the weight of the equivalent steel bodyshell.

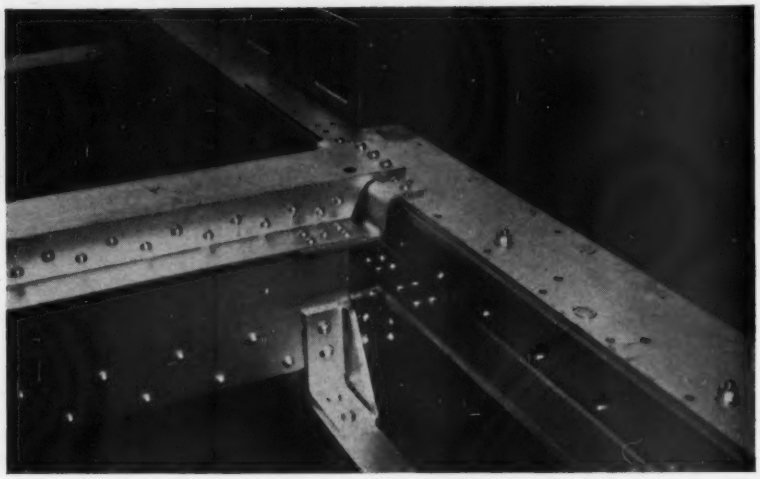
Bodyshell Structure

The aluminium bodyshell structure comprises the main units of underframe, bodyside and end framing, with the associated sheeting and the roof. Most of the main structural framework is assembled with mild-steel rivets driven hot, these being closed in staggered order so that a concentration of heat is avoided which might affect the heat-treated material. All exterior sheeting and most inside panelling and secondary members have been fastened with aluminium-alloy rivets. Sheets were butt-welded to form areas of panelling by the Argonarc process.

Members, of plate or section in heat-treated material, which required to be severely bent or formed, were first worked in the solution-treated condition to assist manipulation, and afterwards the components were given precipitation or final heat-treatment to attain the full mechanical properties necessary.

During assembly of the rolling stock, facing surfaces were coated with zinc-chromate primer. At those points where high-bending moments occur in the cantrail assembly, increased stiffness was obtained, particularly over the end doorways. This was obtained by substituting ¼ in. thick curved plate for the normal sheeting.

The exterior sheeting is in ⅛-in. thick material, riveted by alloy countersunk



Crossbearer end connection at centre doorway

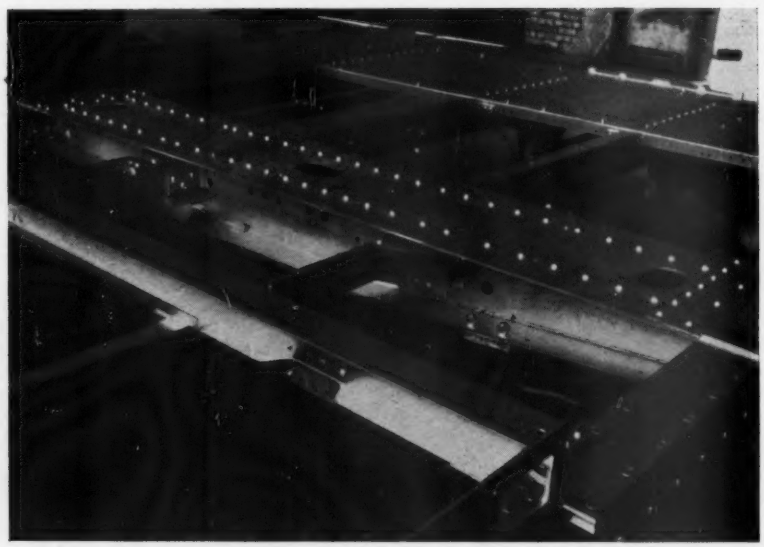
rivets to give a flush finish. Round head alloy rivets were used in other positions. Sheeting was curved as necessary before welding, while the openings for lights and so on, were cut after welding. In a number of cases, such as vestibule sill-plates, corner pillar gussets and plates, cast components are used. In the steel cars, the corresponding parts were built up by welding. The underframe comprises two solebars of channel section stiffened throughout by a truss plate, the gaps at the doorways being compensated by the use of a short length of channel section placed at the door sills, the whole, plated top and bottom to preserve continuity.

Ventilation Ducting

The headstocks are of the same channel section as the solebars with top and bottom gusset plates. Flanged plates have been arranged on the underside to carry back forces from the overriders. Crossbearers transfer the whole of the floor load and the suspended traction and other gear to the bodyside. In modern rolling stock of this type, as much as possible of this gear is placed below the floor, and this, and the conduit, pipe work, and so on, had to be hung from these members. In addition, there is a considerable extent of ducting for the ventilation system which precludes the use of crossbearers with a full depth of web.

These crossbearers are required to be very stiff because of the loading condition, and take the form of top and bottom booms in which the shear load is carried by batten plates. In this manner openings are available for ventilation ducting and for threading conduit. The upper member is of a large top-hat, and the lower one of channel section with deep flanges placed in the inverted position. The flanges of the top-hat section continued by means of a bent plate, and the web of the channel are both riveted to the solebars at each end, the channel also being connected by angle cleats to the underside of the solebar.

Floor structure, showing the central air duct



Underframe, showing the bolster and connections

The longitudinals, which are of zed section, with the upper flange outwards, pass between the upper and lower members of the crossbearers, and at the junction are connected by means of high-strength alloy castings. The centre longitudinals form the two sides of the return air-ducting for the ventilation system, and the upper flanges carry a small zed section for fixing the floor sheets.

The whole of the bodyside framework is built up from a standardised channel section, this being used throughout for main pillars, light rails, and stump pillars. The lower ends of the pillars are riveted to the truss plate and solebar, while the upper ends are built into a special section forming the lower member of the cantrail assembly. This member was so designed to fix both the

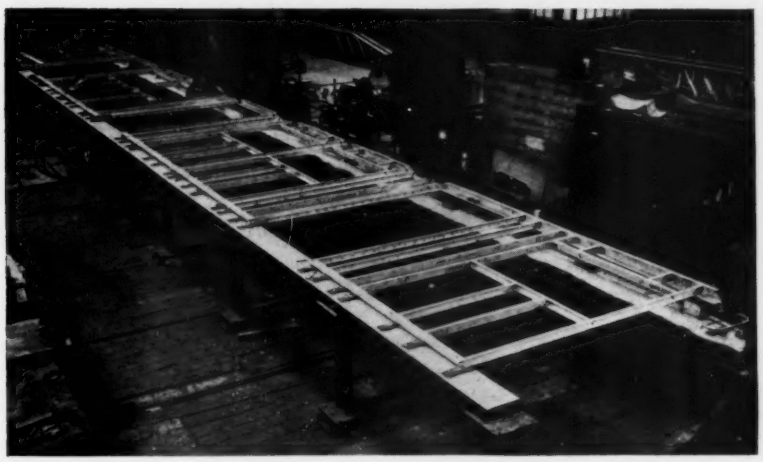
upper ends of the pillars and also to carry curved sheeting above the bodyside panel joint.

Warren Type Girder

The curved sheet in turn is fixed to a second special section forming the upper cantrail member. This latter also forms the support for the roof carlines. On the inside, the upper and lower cantrail members are tied together by flats in the manner of a Warren type girder in order to provide openings for the passage of ventilating air. The lower cantrail member above the pillars is cut to provide openings for ventilation.

To provide structural continuity at these points a high-strength alloy casting is riveted to the outer curved sheet and the web of the lower cantrail member, the castings being suitably pierced to permit the passage of ventilating air. The upper and lower members of the cantrail and also the associated curved outer sheeting are connected by means of diaphragms over each pillar. Where the air grid castings are located, the adjacent diaphragms are extended downwards to connect with the pillar channels. The use of tie-bars as diagonal bracing on the interior side of the cantrail assembly not only facilitated erection but provided space for the threading of various electric conduits, and so on.

Interior, showing the lattice type structure at the cantrail



Bodyside framing in the erecting jig

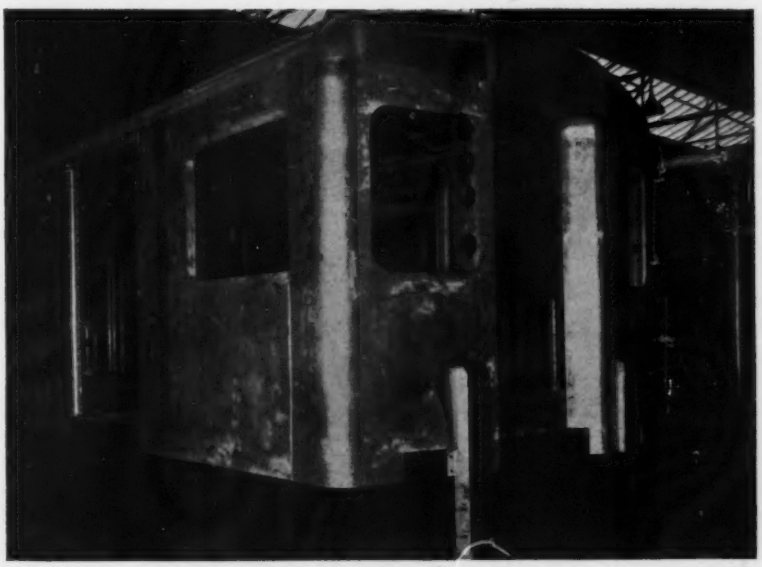
Bodyend Framing

The bodyend framing, built up with large angle sections, is joined by combination of riveting and welding. The sheeting is riveted to this frame. End canopies are formed and welded before attachment to the bodyend framework. In general, the roof follows the steel car design, carlines and purlins being of roll-formed sections or riveted with cleat connections. In places where loading would come from standing passenger handles stiffening was incorporated. The roof sheets are lapped and riveted to the carlines and have chrome impregnated strips at all weather joints. The sheets are lapped over the cantrail assemblies down the length of the car and at the ends are attached to the canopies.

Floor Sheets

The floor sheets are of light alloy of dove-tailed corrugated section and run transversely the length of the car. They are riveted to the underframe members by blind rivets of the Pop type, and the floor is then finished with cork and rubber flooring. The inner sides of the door pillars, which form return air-ducts, are plated with heat-treated sheet material which is Pop-riveted to the pillar flanges. The ventilation ducting on the underside of the car is an aluminium sheet with lock seams, and suspended by aluminium clips. Pipe and conduit clips are in light alloy and the electric lighting conduit is in the same material.

Much consideration was given to the



Over-riders at bodyend

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choice of alloys for the various members, and it was decided to use an aluminium magnesium-silicon type alloy, containing a small percentage of copper and chromium for all main structural framing and other highly stressed members. For the unpainted outside panelling an alloy with a high resistance to atmospheric and other types of attack is required and in consequence an aluminium 3½ per cent magnesium alloy was specified, this being cold-rolled to give a minimum of 0·1 per cent proof stress of 14 tons per sq. in. The sheet material thus approaches the properties of the heat-treated section material and is practically equivalent in strength to the material of the frame members.

The roof section (roll-formed from strip), roof sheets, and floor members, are in aluminium 2 per cent magnesium alloy rolled to half-hard temper. Air-duct panels in the bodyside are in an aluminium magnesium-silicon alloy, but elsewhere are in commercially pure aluminium for ease of fabrication. The counter-sunk rivets and also the mushroom head rivets in the roof are in aluminium—3½ per cent magnesium alloy. The lower exterior mouldings are extruded in commercially pure aluminium and riveted to the bodyside sheets.

The mouldings at cantrail level are in aluminium magnesium-silicon alloy. The major portion of the medium strength castings are in aluminium—12 per cent silicon alloy LM6 of BS, 1490, high-strength castings being in aluminium—10 per cent magnesium alloy to BS, 1490, LM 10-W. Door sill plates are cast in 11 per cent silicon alloy, and heat-treated to give maximum hardness and resistance to wear.

Unpainted Exterior

The Toronto Transit Commission specified that the cars should have an unpainted finish and the exterior panelling has been subject to a mechanical process whereby the whole is given a semi-matt appearance, and welds and rivet lines are virtually invisible. The exterior mouldings and the cast motifs are all polished with recessed portions painted in the Commision's standard red. The whole of the structural framework and the interior of panelling together with the floor sheets were painted with bituminous paint to give added protection. As protection during shipment the whole of the unpainted aluminium exterior surfaces were coated with a pigmented lanolin mixture. In developing both the design of the cars and the workshop techniques used in their construction, the builders have consulted the Aluminium Development Association and the principal suppliers of the structural materials, the Northern Aluminium Company. Other suppliers of aluminium materials were:—

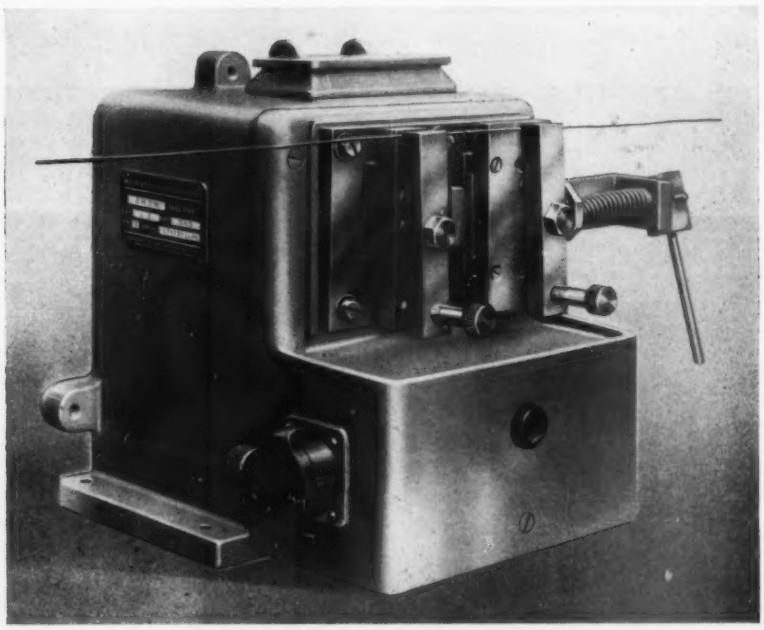
Roll formed sections, floor sheets	Ayrshire Dockyard Co. Ltd.
Bodyend medium strength castings, motifs	Lightalloys Limited
Aluminium-alloy rivets ..	J. Stone & Co. (Deptford) Ltd.
Interior mouldings ..	T.I. (Aluminium) Limited
Door sills	Jones & Foster Limited
Miscellaneous small castings	Eyre Smelting Co. Ltd.
Canopies	Musgrave & Green
Window frames	Beckett, Laycock & Watkinson Limited
Electric light conduits and heating system components	J. Stone & Co. (Deptford) Ltd.
P.G.P. tread plates ..	British Aluminium Co. Ltd.

Fine Wire Brazing Machines

For electrically heating copper wire for silver soldering

THE Metropolitan-Vickers Electrical Co. Ltd., has redesigned a series of wire brazing machines, which form part of the Metrovick range of machines taken over from British Callenders Cables Limited. Two of the series, the BM1 and BM2M, have capacities for copper wire of 0·010—0·080 in. and 0·064—0·144 in. dia., respectively. The maximum input is ¼ and 1½ kVa.

As will be seen from the accompanying illustration the two ends of the wire to be soldered are gripped in clamps at the front of the machine and bent so that the ends spring together. For wires thicker than 0·080 in. it is considered advisable to apply pressure between the ends from an external source, rather than rely on the spring of the wire. The BM2M machine has a clamp mounted on a spring-loaded slide for this purpose.



Metrovick BM2M brazing machine for electrically heating the ends of fine copper wire

Pressure on the push-button closes the primary circuit, and the high secondary current flowing through the joint generates sufficient heat to melt the silver solder which is applied by hand. Solder of medium melting point may be used, with or without flux. A two compartment box is mounted above the clamps in which flux and silver solder is kept.

Power Consumption

Power consumption is negligible. It is said that the heaviest wire can be joined in five sec. The transformer is enclosed in the body of the machine and is normally arranged for connection between phase and neutral of the normal three-phase supply. An inlet socket and plug on the side of the machine body is supplied for connection to three-core T.R.S. flexible cable. A tapping switch is provided to give a range of heating voltages suitable for the full range of the machine.

SUPERHEATER CO. LTD. DIVIDEND.—The directors of Superheater Co. Ltd. have decided to pay the usual half-yearly dividend on the 5½ per cent preference stock. Warrants will be posted on December 30 and transfers must be registered by December 16.

RAILWAY NEWS SECTION

PERSONAL

Mr. M. C. Sivasankaran, Deputy Chief Operating Superintendent, Southern Railway, India, has been appointed Chief Operating Superintendent of that system.

Mr. S. B. Azid, who, as recorded in our October 22 issue, was appointed General Manager of the Eastern Bengal Railway, Pakistan in June this year, was born in 1906. He entered railway service as an Assistant Executive Engineer on the Great Indian Peninsula Railway in 1929. After serving at various stations on that railway he was transferred to the Railway Board, New Delhi, as Deputy Director, Labour Welfare, in 1945. He returned to his parent railway in 1946, and, in 1947, at the time of Partition, he was posted as Divisional Superintendent, Quetta, on the North Western Railway in West Pakistan. After working for about four years as Divisional Superintendent, he was transferred to the Railway Division, Karachi, as Director, Civil Engineering, from where he was transferred as Chief Engineer, Eastern Bengal Railway, Chittagong. He served in this capacity till he was promoted to the position of General Manager in June, 1954, his present position.

Mr. S. B. Azid
General Manager, Eastern Bengal Railway, Pakistan

Mr. M. J. Chughtai
To become General Manager, N.W. Railway, Pakistan, in January, 1955

Mr. R. G. Manson, C.I.E., M.Inst.T., and Mr. Robert Flack, B.L., Ll.M., M.Inst.T., have been re-appointed Members of the Northern Ireland Transport Tribunal for a further year until December 31, 1955.

Mr. M. A. Crane, M.Mech.E., M.I. Loco.E., London Manager of Beyer Peacock & Co. Ltd., has been appointed Technical Sales Manager of the company as from May 1. Mr. M. A. Lockhart, A.M.I.C.E., A.M.I.Loco.E., has been appointed, with the title of Technical Representative, as Assistant to Mr. Crane. Mr. Lockhart was trained on British Railways, and, at the time of this new appointment, was Technical Assistant, British Transport Commission.

Mr. M. Jalal-ud-Din Chughtai, General Manager, North Western Railway, Pakistan, who, as recorded in our October 22 issue, will become General Manager of the Eastern Bengal Railway, Pakistan, in January, 1955, was born at Lahore on January 27, 1904. After graduating B.Sc. with honours in physics from the Government College, Lahore, he went to the United Kingdom in 1923 to study engineering. He obtained a first class Honours Degree in Engineering from London University, besides the Diploma in Engineering from King's College, London. Mr. Chughtai served an apprenticeship with railways in this country under the Engineer-in-Chief, Southern Area, London, and the North Eastern Railways, and, in September, 1926, he was appointed Assistant Executive Engineer in the I.R.S.E. and was posted to the East Indian Railway on October 28, 1926. In April, 1941, he began to officiate as an Executive Engineer. Previous to this he also worked as Divisional Personnel Officer. In August, 1925, he took over as Secretary to the General Manager, East Indian Railway, an appointment which he held until June, 1946. In the same year, he was awarded the honour of M.B.E. for rendering meritorious services in the planning and construction of Ordnance Depot sidings and remodelling of various stations on the East Indian Railway to increase the line capacity. In June, 1946, he became Joint Director, Establishment, on the Railway Board (India) and also officiated for some time as Director of Establishment. On partition he became Director of Establishment in the Railway Division, Ministry of Communications, Karachi, and also officiated as Director General, Railways, for a period of about two and a half months from May to July, 1948. On August 1, 1949, Mr. Chughtai took over as Chief Engineer, North Western Railway. During his tenure as Chief Engineer, he was responsible for handling the situation brought about by the Punjab floods of 1950, which had caused unprecedented damage to railway lines and property. Mr. Chughtai has been General Manager of the North Western Railway since July 9, 1952. During his tenure of office, the N.W.R. Administration carried out the construction of the new Mardan-Charsadda Railway.

We regret to record the death on November 19, at the age of 68, of Mr. George C. Dew, retired Foreign Freight Traffic Manager for the Canadian Pacific Railway. Mr. Dew, who retired in 1951, after nearly 47 years of service with the Canadian Pacific, joined the company in Toronto. He was trans-

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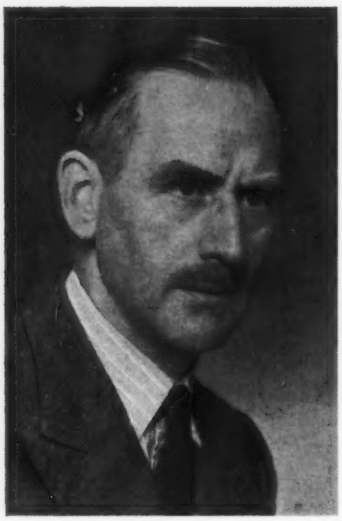

Mr. W. L. Rigby

Appointed District Engineer, Aberdeen, Scottish Region

Mr. E. F. Hamilton

Assistant Workshops Superintendent, N.Z. Government Railways

Mr. A. K. Chaudry

Engineer-in-Chief, Survey & Construction, North Western Railway, Pakistan

ferred to Montreal shortly afterwards where he rose to the position of Foreign Freight Traffic Manager in 1941.

Mr. W. L. Rigby, A.M.I.C.E., Assistant District Engineer, Glasgow (South District), Scottish Region, British Railways, who, as recorded in our November 12 issue, has been appointed District Engineer, Aberdeen, as from November 1, was educated at Manchester Grammar School and at Manchester University, where he graduated B.Sc.Tech. in 1920. Following training in structural engineering, he became a Designer and Assistant Engineer with Imperial Chemical Industries in Billingham-on-Tees in 1925. Four years later, Mr. Rigby was elected an Associate Member of the Institute of Civil Engineers, and subsequently joined the staff of the Divisional Engineer, Manchester, L.M.S.R., in 1931 as Assistant in the Bridge Section. In the following year he became Senior Assistant to the District Engineer, Manchester. In 1937 Mr. Rigby moved to the District Engineer's Office, Barrow-in-Furness, as Chief Draughtsman, and was appointed Assistant District Engineer, Abergavenny, in 1942. Two years later, he became Assistant District Engineer at Inverness, and, in 1945, was transferred to a similar position at Irvine. In 1948 he was appointed Assistant District Engineer at Glasgow, which district was later redesignated Glasgow (South) District, British Railways, Scottish Region.

Mr. J. R. Brown, Assistant Foreign Freight Agent, Canadian National Railways, has been appointed General Freight Agent at Vancouver, succeeding Mr. W. A. Whyte, who retired on November 30, after 43 years of service.

The Directors of the P. & M. Co. (England) Ltd., announce that, effective January 1, 1955, Mr. A. C. Meyrick, at present Managing Director, has been appointed Deputy Chairman. His place as Managing Director will be taken by Mr. W. A. H. Watts, who will retain also the position of Chief Engineer.

The Directors also announce the election of Mr. D. Dudley Morgan to a seat on the board.

Mr. E. F. Hamilton, A.M.I.Mech.E., A.M.N.Z.I.E., Assistant Workshops Superintendent, New Zealand Government Railways, who, as recorded in our November 19 issue, has arrived in Britain on a tour of British Railways engineering centres and works producing equipment for the New Zealand railway system, served his apprenticeship to the fitting trade in the New Zealand Railway Department's workshops at Addington from 1924 to 1929. During this period, he was attached to Canterbury University College. He won one of the first two scholarships awarded to apprentices and young tradesmen, and pursued a course of study for the associate membership examination of the Institution of Mechanical Engineers. He was engaged for some time on time study work, and, in 1936, was appointed as Apprentice Instructor at Addington. In 1939 he spent a year at the works of the Westinghouse Brake Company in Sydney, New South Wales, and during the next two and a half years he was engaged in brake work in the office of the Chief Mechanical Engineer in Wellington. He was appointed Assistant Works Manager at the Hutt Valley Works of the Department in 1942, and, in 1946, was transferred to a similar position at the Hillside Works in Dunedin. Mr. Hamilton was appointed Works Manager at Hillside in 1947, and held this position until he was promoted to his present position of Assistant Workshops Superintendent in the office of the Chief Mechanical Engineer, Wellington, in 1950.

Mr. E. Hamilton, who was appointed General Manager of the Jamaica Government Railways in May this year, has been on a visit to this country for discussions with the Crown Agents for Oversea Governments & Administrations.

The Pakistan Government has appointed Mr. E. R. Hondelink to advise the Planning Board as consultant on transport and communications for a period expected to last several months. Mr. Hondelink is leaving for Karachi on January 4.

Mr. O. R. Guard and Mr. K. F. Dormer have been elected directors of Parsons Engineering Co. Ltd.

Mr. Ataullah Khan Chaudry, Engineer-in Chief, Survey & Construction, North Western Railway, Pakistan, who was largely responsible for the 17-mile Mardan-Charsadda construction referred to in our issue of November 19, joined the Indian Railway Service of Engineers on the Bengal Nagpur Railway on February 17, 1936. He became District Engineer on February 25, 1946, and, on the establishment of Pakistan, he was transferred to the North Western Railway on which he served in the capacity of Divisional Engineer until October 30, 1950, the date of his appointment as Deputy General Manager. Mr. Chaudry was subsequently appointed Engineer-in-Chief, Survey & Construction, the position he now holds.

The late Mr. H. J. Guest, whose death was recorded in our last week's issue, entered the service of the London & North Western Railway in 1886 as an apprentice clerk in the South Staffordshire District, and, after training at goods stations in that area, was transferred to the District Goods Manager's Office at Wolverhampton. He was appointed Chief Claims Clerk in 1908, and Chief Staff Clerk in 1912. In 1917 he become Chief Clerk to the District Officer, was transferred in 1918 to the then London & North Western headquarters at Euston as Chief Staff Clerk to the Chief Goods Manager, and, in that capacity, rendered important service in connection with the negotiations between the railway companies and the unions which resulted in the agreements of March, 1920. Mr. Guest was appointed Chief Clerk to the Chief Goods Manager in 1920 and, on the fusion of the London & North Western and Lancashire & Yorkshire companies in January 1922, he became Indoor Assistant. He held a corresponding position under the L.M.S.R. until he was appointed Operating Assistant to the Goods Operating Manager in 1928, the position he held until his retirement in 1930.

Mr. W. Gilmour Smith, Chairman of W. Gilmour Smith & Co. Ltd., Glasgow, left London on November 15 on a business visit which will include railway headquarters in Spain, Nigeria, and the Gold Coast. He will be out of the country until December 21.

Association of British Travel Agents Convention, 1954

Plea for more midweek railway travel; Sir Brian Robertson on railway modernisation plan

The fourth annual convention of the Association of British Travel Agents was opened at Church House, London, S.W.1, on November 24, by Sir Arthur Morse, Chairman of the Association. He told delegates that the steady growth each year in international travel depended much on the success of the efforts of travel agents. Over 1,000,000 Britons took their holidays abroad, and British travel agents were largely responsible for this invasion. Yet, less than half as many came from Continental countries for holidays in Britain. Twenty million Europeans crossed the borders of their own countries to visit each other on holiday every year. Surely Britain could attract more than the present 400,000 who selected this country for their annual trip. That was a challenge to all in the travel industry.

Railways Session

The Railways Session was held on November 25, with Mr. J. W. Frame, Managing Director of Frames' Tours Limited, presiding. Mr. Frame welcomed the representatives of transport undertakings and travel agents present. He regretted the absence of Mr. R. E. Sinfield, Continental Superintendent, Southern Region, and Mr. H. O. Ernst, Manager of the Swiss National Tourist Office in London, who were attending the Agents' Special Train Conference at Genoa. The railways, he said, were the mode of travel to be developed. No other was so important. They carried more than any other form of locomotion and were the most dependable. They were faced with greater competition, but had much improved their facilities in the past twelve months. The "Starlight Special" trains between London and Scotland had been a great success and recaptured traffic. Although there were now more seats available the 8- and 15-day special tickets had ceased, and Mr. Frame asked why they should not be issued on Saturdays out of season, and by all Regions. The best ticket the railways ever had was the 1d.-a-mile monthly return and similar facilities should again be offered. Mr. Frame also thought that regulated booking arrangements were a deterrent to travel. In the first week of March, 1955, all members of A.B.T.A. would stage "railway week" displays in their windows. Mr. Frame commended the satisfactory working of all British Railways arrangements for continental travel.

In the ensuing discussion Mr. A. Jones, Chief Assistant (Passenger) to Commercial Superintendent, London Midland Region, said that the 8- and 15-day tickets had been experimental and they would be guided by results. The former monthly return ticket, introduced in 1933, was in force today, but with a three-month validity. It had become the ordinary return ticket and the ordinary single ticket had come down in price. In his experience, regulated booking arrangements were not resented by passengers. The arrangements of the London Midland Region in respect of the Blackpool traffic went back to Lancashire & Yorkshire days. The Western Region now had similar arrangements for its Torquay traffic.

Problem of Peak Traffic

Mr. O. R. Smart, Assistant Commercial Superintendent (Passenger), Eastern Region, said that railway transport had to deal with peak traffic, which meant that much rolling stock was used for only a little time each year. The travel agents should encourage midweek travel both in their own and the railways' interests. Regulations as to the validity of tickets were necessary because of abuses. In his region alone there were 12,000 to 13,000 cases of ticket abuses. He did not think the railways lost by not offering a reduction on a return ticket.

Mr. H. J. Bourn, Assistant Continental Superintendent, Southern Region, representing Mr. Sinfield, was glad to hear praise of the new Continental Enquiry Office arrangements at Victoria. They were going to transfer to that office the Southampton and Channel Isles business at present handled elsewhere at Victoria. The Ostend traffic was particularly heavy and they were hoping to have more trains available on the Belgian side; the Belgian National Railways, however, had difficulty in always providing stock because of their many other commitments. Next year through bookings between important provincial towns and the Channel Isles would be available.

At a banquet given by the Association on November 26 the guest of honour was Mr. J. D. Profumo, Joint Parliamentary Secretary, Ministry of Transport & Civil Aviation. Others who attended included:—

Messrs. E. W. Arkle, H. Arkle, C. K. Bird, D. Blee, Colonel A. C. Bonnaffon, Messrs. H. J. Bourn, E. I. Froshaug, R. H. Hacker, F. Hancock, F. D. M. Harding, C. P. Hopkins, R. E. M. Hughes, B. X. Jessop, C. Keep, D. McKenna, W. H. F. Mepsted, A. Mertz, F. E. Phasey, H. H. Phillips, A. C. B. Pickford, J. E. M. Roberts, Sir Brian Robertson, Messrs. O. R. Smart, J. L. Tregoning, M. Vignon, J. W. Watkins.

Sir Brian Robertson, Chairman of British Transport Commission, speaking at the banquet, referred to the Commission plan for the modernisation of British railways. "It quite deliberately aims at providing this country with the best railway system and service in the world. She has had it before and she is 'darned' well going to have it again," said Sir Brian Robertson. "It also aims, and aims with confidence, at putting British Railways in a sound economic position in which the capital investments in them will pay a proper return," he added. He said that, in spite of what had appeared in the Press, the plan was not yet in the hands of the Minister, and he thought that it would be more likely to gain Ministerial support if it were received by the Minister before the details were given to the public. Sir Brian Robertson spoke of the criticisms which the Commission received; some complained that the rolling stock was too old, others that the stations should be modernised. Some asked that trains should be faster and that they should stop at more stations. Others asked for more first-class accommodation, and others less, and some said that meals were not so good as on the Continent at twice the price.

Presentation to Mr. S. W. Smart

On the occasion of his retirement, Mr. S. W. Smart, Superintendent of Operation, British Railways, Southern Region, was entertained to lunch on November 26 by the officers of the Region and as a token of esteem and affection was presented with an electric clock and a pen and pencil set, and also an inscribed and illuminated album of signatures.

Mr. C. P. Hopkins, Chief Regional Manager, made the presentation.

Sir John Elliot, formerly General Manager, Southern Railway, and now Chairman of the London Transport Executive, Mr. R. P. Biddle, Docks & Marine Manager, Southampton, and Mr. W. H. F. Mepsted, Commercial Superintendent, Southern Region, also spoke. References were made to Mr. Smart's efficiency as a railway officer and his co-operation as a friend.

Mr. Smart, in his reply, alluded specially to the help that his department had invariably received at the hands of others.

Mr. Hopkins making the presentation to Mr. Smart on November 26, with Sir John Elliot and Mr. Biddle looking on

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Naming East African Railways Beyer-Garratt Locomotives

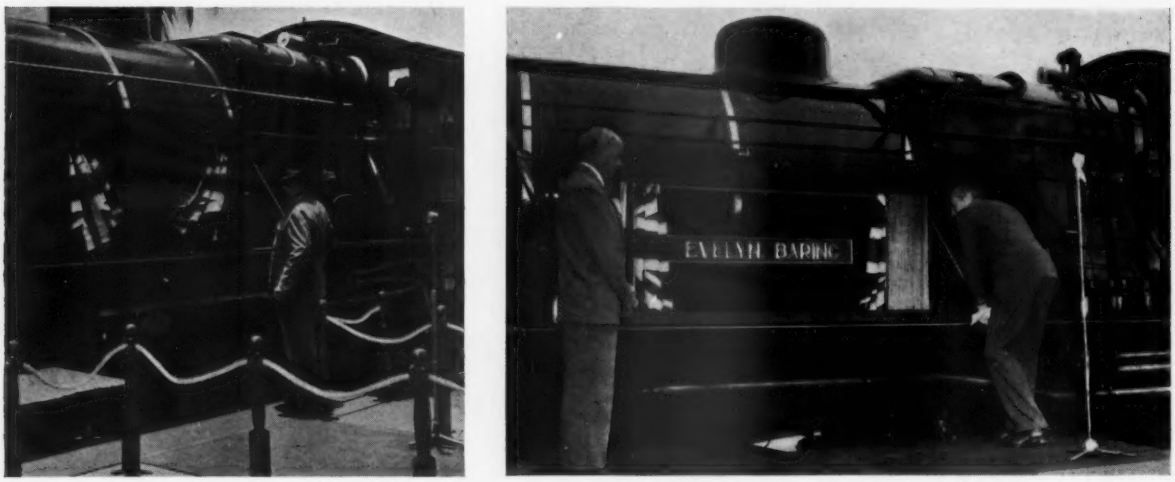
Sir Andrew Cohen, Governor of Uganda, naming one of the new "60" class locomotives "Sir Andrew Cohen" at Kampala; seated is Major-General W. D. A. Williams, Commissioner for Transport, East Africa

The East African Railways & Harbours are naming the new "60" class Beyer-Garratt locomotives after present and past Governors of Kenya, Uganda, and Tanganyika. The accompanying illustrations show locomotives of the class being named at recent ceremonies at Kampala, Dar es Salaam, and Nakuru.

These locomotives are of the 4-8-2 + 2-8-4 type and were briefly described in our February 26 issue. They weigh 154 tons in working order. The naming of one of them after Sir Evelyn Baring, Governor of Kenya, took place on the opening day of the Royal Agricultural Show at Nakuru, and an illustration of this locomotive and new rolling stock on exhibition there accompanied a description of the East African Railways & Harbours display at the Show which appeared in our November 26 issue.

At the end of last year the East African Railways were operating a total of 78 locomotives of the 4-8-2 + 2-8-4 and 4-8-4 + 4-8-4 wheel arrangement, ranging in age from two to 26 years.

The East African Railways are considering naming after East African tribes the locomotives of the "59" class which are now under construction by Beyer Peacock & Co. Ltd. These locomotives, which are also of the 4-8-2 + 2-8-4 type, will be the heaviest and most powerful Beyer-Garratt locomotives to be operated on the metre gauge.



(Left) Sir Edward Twining, Governor of Tanganyika, and (right) Sir Evelyn Baring, Governor of Kenya, unveiling the nameplates of locomotives bearing their names at Dar es Salaam and Nakuru respectively. With Sir Evelyn Baring is Mr. W. Urquhart, Deputy General Manager, East African Railways & Harbours

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PROGRESS OF ELECTRIFICATION IN ITALY.—On October 4, electric traction was introduced on the 29-mile Bologna-Ferrara section of the 76-mile double-track Bologna-Padua main line. The conversion of the Ferrara-Padua section is in progress. The electrification of the Bologna-Padua main line is the first item of the electrification programme comprising the conversion of the main artery in northern Italy—the main line running from Venice in the east via Milan and Turin to Modane, on the French-Italian border in the west. The westernmost section, the 66-mile Modane-Turin line, has been electrified since the early 1920s on the three-phase system at 3,700 volts, a.c. This system will be replaced by the 3,000 volt d.c. system adopted in Italy since before the second world war. The Turin-Genoa electrified line (103 route-miles) is to be converted similarly before the conversion of the Turin-Milan-Venice main line is undertaken. The short but important main line between Milan and Bergamo, 34¼ miles, is being electrified. Between Milan and Treviglio, 21 miles, the line is common with the Milan-Verona-Venice main line. In Sicily, the conversion of the Messina-Palermo main line is being proceeded with between Sant'Agata di Militello and Palermo, 78 miles. Electric traction is in operation on the Messina-Sant'Agata di Militello section, 66 miles. According to an announcement by Signor di Raimondo, General Manager of the State Railways, the conversion of the Palermo-Sant'Agata di Militello section is to be completed in 1955, as well as the laying of the second track on the 23-mile Palermo-Termini Imerese section. After the complete conversion of the Messina-Palermo main line that of the Messina-Catania-Siracusa main line, 114¼ route-miles, is to begin.

Withdrawal of Southern Region Branch Train Services

After a review of the economic circumstances and consultation with the Transport Users' Consultative Committee, it has been decided to withdraw train services on the Meon Valley and Petersfield-Midhurst-Pulborough lines of the Southern Region from February 7, 1955.

Meon Valley Line

On the Meon Valley line, the passenger service will be withdrawn between Alton and Fareham, and the line will be closed entirely between Tisted, Privett, and West Meon, inclusive; freight services will continue to operate between Alton and Farringdon and between Fareham and Droxford.

British Railways will maintain cartage services for parcels and freight traffic throughout the area, and facilities for traffic in wagon loads will remain at Alton, Farringdon, Droxford, Mislingford, Wickham and Fareham.

It is expected that a bus service will be arranged to provide a through service between Portsmouth, Wickham, Droxford, West Meon, Privett, East Tisted, Farringdon and Alton.

Petersfield-Midhurst-Pulborough Line

The passenger train service will be withdrawn from Rogate, Elsted, Midhurst, Selham, Petworth, and Fittleworth stations, and the line will be closed entirely between Petersfield and Midhurst exclusive.

Freight services will continue to operate between Midhurst and Pulborough.

British Railways will maintain cartage services for parcels and freight traffic throughout the area and facilities for truck load traffic are available at Petersfield, Midhurst, Selham, Petworth, Fittleworth and Pulborough.

It is expected that a bus service will be provided between Petersfield, Rogate Station and South Harting.

Signalling for Chelmsford Electrification

The forthcoming electrification between Shenfield and Chelmsford, Eastern Region, will involve alterations to signalling on this 9½-mile double-track section. A contract has been awarded to the Siemens & General Electric Railway Signal Co. Ltd. (see our November 12 issue) for this work, which primarily involves the adaptation of the existing signalling installation to the new conditions imposed by the introduction of a 1,500 V. d.c. overhead traction system. The contract also includes the supply and installation of telecommunication cables.

Provision of a.c. Track Circuits

With the exception of those signals within the control limits of Shenfield, Ingatestone and Chelmsford, all signals are at present automatically controlled by means of d.c. track circuits, which will be converted to capacitor-fed single-rail or double-rail operation using a.c. double-element vane type track relays; there will be 29 single-rail and 45 double-rail track circuits, the latter using auto-coupled impedance bonds.

The existing mechanical lever frames at Ingatestone and Chelmsford will remain, but will be provided with additional electric lever locks to provide the new control conditions. A complete power distribution system at 650 volts 50 cycles a.c., single-phase, will be provided throughout, with switchboards, transformers, etc., at Ingatestone and Chelmsford signalboxes.

New multi-core signalling and power cables of the special rubber compound insulated and sheathed type will be provided throughout the section of line, and in addition the contract includes the provision of three cables for the telecommunication circuits over a distance of ten miles.

Parliamentary Notes

B.T.C. (Organisation) Scheme

In the House of Lords on November 24 the Earl of Selkirk (Paymaster-General) moved that the British Transport Commission (Organisation) Scheme Draft Order, 1954, be approved. He said that one small alteration had been made as a result of the discussions in both Houses of Parliament. In paragraph 9, before the words in the third line, "with the approval of the Minister" the words "after consultation with and" had been inserted. That was intended to leave the initiative with regard to operating costs and statistics with the Commission but to make quite clear that in approving the form in which they should be published the Minister should have prior consultation.

Railway Expenditure

Lord Mathers asked how railway expenditure of £445,000,000 would be allocated among the six areas. Only £1,000,000 would be left in the hands of the Commission for its own purposes, and the best part of the expenditure would be for the areas to handle. What the railways needed at the present time was a greater sense of vocation and a renewal of the old loyalty and devotion to the service that existed in the first quarter of this century.

The Earl of Selkirk, replying to the discussion, said he felt sure that any organisation, and certainly the railways, would be delighted if all their staff had the sense of devotion which Lord Mathers had suggested as desirable. One of the purposes of the area authorities was to encourage loyalty and *esprit de corps* among the staff and to ensure attention to welfare in all its forms.

The position about charges, said Lord Selkirk, was really quite clear, because it was laid down in the Transport Act, 1953, which said the Order should reserve to the Commission general financial control and general control of the charges to be made for the services and facilities provided.

On running expenditure Lord Selkirk said it was intended that the railway system should work as a whole, so the actual current expenditure was slightly irrelevant. The question was whether essential standards were maintained.

Scottish Transport Council

One of the things the Government had in mind to do was to set up a Scottish Transport Council. That could only be done after the area authority was already in operation. It was not intended that this Council should be an executive body, but it would be a body which was representative of all forms of publicly owned and publicly assisted transport in Scotland—whether by road, rail, sea, or air. The object was that it should meet and discuss matters of common interest with a view to developing an efficient and co-ordinated system of public transport in Scotland. The organisation scheme was only one of three important developments which were taking place on the railways. There was a charges scheme which was being considered by the Commission—that was the second development. The third was modernisation of equipment but such a scheme would need very wide consultation with the different interests concerned.

The motion was agreed to.

British Transport Commission Scheme

Mr. John Boyd-Carpenter (Minister of Transport & Civil Aviation) in the House of Commons on November 23, moved that the Draft British Transport Commission (Organisation) Scheme Order, 1954, be approved. He said that the railway reorganisation scheme was debated on November 1 and that the Opposition shared the Government views about decentralisation and devolution. That narrowed the area of dispute down to the methods suggested in the scheme.

The 1953 Act left open the question whether an area authority should be an individual or a board. It had been decided that a board was the best as it would be valuable for the support it could give the Chief Regional Manager. The Commission intended to appoint to those boards people who had an understanding of the needs of their particular areas. The chain of command would run from the Commission to the area boards, and from the area boards to the Chief Regional Managers.

Initial Composition of Boards

The Minister said that if the Order was approved by both Houses, the Commission hoped to be able to announce simultaneously the initial composition of the area boards and they hoped to be able to make that announcement next month. The initial announcement would not cover the full seven members who under the scheme could be appointed to each board. The Commission intended to start the appointments on a numerical basis, and add more members from time to time.

Mr. Ernest Davies (Enfield E.—Lab.) said that he and many other members of the Opposition were still unconvinced that it was necessary to set up "these superfluous area boards."

Trade Union Representation

The railway trades unions were the most concerned with the successful running of the railways. They had been told that the boards would include people representing commerce and industry, and that it was not necessary for those people to have experience in or knowledge of transport matters. Yet the boards were going to be responsible for the management of the railways. The one section of the community who had a great knowledge of the operation and the management of the railways was not being given the right to serve on the boards. The unions had asked that the terms of the 1947 Act should be incorporated in the Order. The Opposition regretted very much that the Minister had not taken that into account.

It was extraordinary, he added, that the House should not be told what the remuneration of the members of the boards would be. They had been told that decentralisation would not be carried to a point where there was any destruction of unification of the railways. It was hard to believe that with an expenditure of only £1,000,000 it would be possible for the Commission to continue unification.

The Opposition, Mr. Davies went on, was opposed to the foisting of area boards

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on the Commission. The idea was based on a complete misunderstanding of how the old railway boards worked. They were superfluous and might create additional bureaucracy. It was not too late to withdraw the Order and let the Commission get on with its job.

Initiative Strangled

Mr. J. A. Sparks (Acton—Lab.) said the Minister was strangling the initiative of the B.T.C. and British Railways in carrying out their functions and purpose. The proposals were quite unnecessary, and would create difficulties where they did not exist at present. The B.T.C. would find itself strangled by a network of committees of all kinds and the Chief Regional Managers would be restricted in the exercise of their initiative.

Mr. P. H. Collick (Birkenhead—Lab.), winding up for the Opposition, said the scheme had been forced on the Commission at the political whim of the Government because of its hatred of nationalisation.

Rôle of B.T.C.

Mr. Hugh Molson (Joint Parliamentary Secretary to the Ministry of Transport & Civil Aviation), replying to the discussion, said it was intended that the Commission should be a policy-making authority in the sense that it should decide what should be the general standard of maintenance of the permanent track. It would decide what type of locomotive and rolling stock should be produced.

The area boards would control and be responsible for the workshops at London, Doncaster, and Derby. After the area boards had prepared their budgets in the sense of what they would like to spend upon developing the services in their areas, the budgets would be submitted to the B.T.C. which would say, in view of the amount of money available, that it would be necessary for certain cuts to be made. The purpose of setting up the boards was to ensure that the administration of the railways was not only informed of how to run big concerns, but at the same time to be representative of the people living in a particular area.

On a division the motion was carried by 286 to 266, a Government majority of 20.

Questions in Parliament

Railway Freight Charges

Mr. Hector Hughes (Aberdeen N.—Lab.) on November 10 asked if the Minister of Transport & Civil Aviation would state the results of his conversations with the Secretary of State for Scotland and the Chairman of the Scottish Tourist Board designed to bring into operation a scheme for the equalisation of railway freight charges in and to Scotland, and also designed to eliminate the hardships caused by the present anomalies in freight charges; and what steps he proposes to take in these matters.

Mr. John Boyd-Carpenter said that there had been no such conversations.

Mr. Hughes asked if the Minister had not had some conversation with his predecessor about this matter. Was he not aware that the expense of transport in the North of Scotland was holding up vast industrial planning there, and would he look into the matter and do something about it.

Mr. Boyd-Carpenter said this was an important matter, but there had been no conversations on the subject, nor could there usefully be any. It was a matter for the B.T.C. to prepare a scheme and then to submit it to the Transport Tribunal, where Scottish interests could, and no doubt would, express their views.

Scottish Transport Council

Mr. John Maclay (Renfrew W.—Nat. Lib. Con.), on November 24 asked the Minister of Transport & Civil Aviation, when it was proposed to set up a Scottish Transport Council.

Mr. John Boyd-Carpenter stated in a written reply: The Government adhere to the promises given during the debates on the Transport Bill and intend to implement them. The Transport Council cannot, of course, be set up until the Scottish Railway Authority is in being; but when that Authority has been constituted the necessary steps will be taken to set up the Scottish Transport Council.

Railway Permanent Way

Dr. Somerville Hastings (Barking—Lab.) on November 16 asked what complaints the Minister of Housing & Local Government had received from local authorities as to their inability to deal with the potential danger involved in the discharge of the lavatories of railway carriages on to the permanent way; and whether he would consult with the B.T.C. as to the extent of this danger and how it could be avoided.

In a written reply Mr. Duncan Sandys stated that his Department had received no complaints from local authorities on this matter since 1948.

London Transport Committee Report

Captain R. Ryder (Merton & Morden—C.) on November 17 asked when the inquiry the Minister of Transport & Civil Aviation had ordered into London Transport would make its report.

Mr. John Boyd-Carpenter replied: I understand that the Committee of Inquiry is now drafting its report, which I hope will reach me by the end of the year.

London Airport: Railway Connection

Mr. Paul Williams (Sunderland S.—C.) on November 17 asked what recent consideration had been given to the possibility of connecting the new terminal buildings at London Airport with the London underground system.

Mr. John Boyd-Carpenter (Minister of Transport & Civil Aviation) in a written reply, stated: The B.T.C. and the air corporations jointly considered this question early this year and concluded that the underground system was unsuitable for the carriage of airline passengers and their baggage and that special fast trains could not be superimposed on existing services.

Gatwick Train Services

Mr. C. F. H. Gough (Horsham—C.) on November 24 asked the Minister of Transport & Civil Aviation the result of his discussions with the B.T.C. with regard to arrangements for railway services between Gatwick Airport and London; and what extra facilities were to be provided.

Mr. John Boyd-Carpenter, in a written reply, stated: Gatwick Racecourse Station will replace the present Gatwick Airport Station and will be served by four trains an hour to and from London. Two of these will be semi-fast with special two or four coach portions for the journey between London and the Airport, and two will be slow trains. At present there are two slow trains and one semi-fast train with no special coaches.

Staff & Labour Matters

Railway Wages

The award of the Railway Staff National Tribunal giving increases ranging from 2s. 6d. to 8s. 6d. per week to footplate staff on British Railways was discussed on the November 24 between representatives of the B.T.C., of the N.U.R. and A.S.L.E.F. after which the meeting adjourned. Subsequently, it was announced on November 26 that as the N.U.R. and A.S.L.E.F. had decided to accept the Tribunal award the increased rates of pay would be entered up immediately.

Since the meeting on November 18, when the N.U.R. leaders explained to the Commission their reasons for repudiating the agreement on improved rates of pay for conciliation staff (other than footplate staff) on British Railways, no further talks have taken place. The N.U.R. London District Executive, however, held a special delegate conference on November 30 urging full implementation of the union's wage claim.

Further talks between representatives of the Commission and the three railway trade unions took place on November 26 to discuss the proposed revision of the salary structure for British Railways salaried grades.

London Transport Railway Staff Claim

On November 25 the London Transport Executive rejected a claim by the N.U.R. for a revised wages structure for wages staff employed by London Transport railways. The claim is stated to cost £650,000 per annum. It is proposed that the claim should be referred to the London Transport Railway Wages Board to determine the rates for the lowest and highest grade in each of the four sections of the railway department, the rates for intermediate grades then to be settled by the negotiating committee. The N.U.R. undertook that the proposal would be reported to its executive committee.

Busmen Seek £1 Increase

A claim for a wage increase of about £1 a week for 100,000 busmen employed by private companies and the B.T.C. in the provinces was presented at a meeting of the National Council for the Omnibus Industry on November 30. The unions also seek improved conditions. The employers will reply shortly. Negotiations for increases for London busmen are due to be resumed today (Friday).

COLCLAD STEELS.—Colclad is the registered trade mark for the range of clad steels developed by Colvilles Limited, of Glasgow. In addition to stainless clad steels the firm has added nickel clad and Monel clad steel to their list of products. Much information on the manufacture, uses, and properties of these materials is given in an illustrated book issued by the firm. Colclad plates, which consist of a layer of cladding metal bonded to a selected thickness of carbon or low alloy steel, are manufactured under closely controlled conditions. All materials are specially prepared. Backing and cladding metals are processed individually by rolling, cutting, and machining to specific dimensions which are governed by the size and thickness of the clad plate. Information on thermal conductivity, corrosion, physical tests, and so on, are included, together with many examples of the use of Colclad which are illustrated by numerous halftones.

Contracts & Tenders

The British Transport Commission has placed orders with the Birmingham Railway Carriage and Wagon Co. Ltd., for 100 third class saloons with centre gangways, and 97 20-ton ballast brake vans with ploughs.

The order for 200 triangulated wagon underframes placed by Coras Iompair Eireann with the Metropolitan-Cammell Carriage & Wagon Co. Ltd., has been increased to 220.

Leyland Motors Limited has received from Coras Iompair Eireann an order for 70 Titan double-deck bus chassis.

The New Zealand Government Railways are asking for tenders for 20 main line diesel-electric locomotives. See Official Notices on page 644.

On and from December 15, the address of the India Store Department (at present at 32-44, Edgware Road, London, W.2) will be: Government Building, Bromyard Avenue, Acton, London, W.3.

According to the Special Register Information Service, Export Services Branch, Board of Trade, the United Kingdom Trade Commissioner at Calcutta has reported that the closing date of the call for tenders for 3,000 V overhead equipment, issued by the General Manager, Eastern Railway, Calcutta, has been postponed to January 17, 1955.

The Special Register Information Service, Export Services Branch, Board of Trade, reports a call for mechanical railway signalling equipment (Tender No. SRIA/19544-E/V), issued by the Director General of Supplies & Disposals, Shahjahan Road, New Delhi. Tenders must be submitted by December 20.

A set of tender documents, including conditions of contract and drawings, may be obtained on loan on application to the Branch (Lacon House, Theobalds Road, London, W.C.1). Local representation is essential.

The Director General of Supplies & Disposals, New Delhi, invites tenders for (*a*) 1,830 window frames, louvre, complete; (*b*) 400 axle box covers.

Tenders are to be submitted to the Director General of Industries & Supplies, Shahjahan Road (Section SRI), New Delhi, quoting reference SRI/16911-E/1 for (*a*) and SRI/16950-E/1 for (*b*), and will be received up to 10 a.m. on (*a*) December 17, (*b*) December 21.

Forms of tender are only available for purchase in India from the Deputy Director General (Supplies), Directorate General of Supplies & Disposals, New Delhi; Director of Supplies & Disposals, Bombay or Calcutta; Deputy Director of Supplies & Disposals, Madras.

If the date for the receipt of tenders does not allow sufficient time for tenderers to obtain tender forms from India, they may submit their quotations to India in their own letter form or by telegram so long as all essential particulars are given and provided they simultaneously apply for tender forms and return them duly completed as quickly as possible on the basis of advance quotations already submitted.

A copy of the tender form can be examined at the India Store Department on application to the "CDN" Branch. The drawings can be seen at the offices of Hodges Bennett & Company, 59-60, Petty France, London, S.W.1, from whom copies may be obtained at a fixed price per sheet.

The Special Register Information Service, Export Services Branch, Board of Trade, states that during a tour of Angola the Consul at Loanda was asked by the Secretary of the Associacão Comercial (Chamber of Commerce) in Lobito if he might receive United Kingdom trade publications and, in particular, descriptive literature in Portuguese relating to United Kingdom export goods.

As an additional means of publicising United Kingdom goods and of meeting foreign competition, it is suggested that firms interested in exporting to Angola might send their literature to the Secretaries of the Chambers of Commerce or their equivalent in Loanda, Nova Lisboa, Sa da Bandeira, Mossamedes, Lobito, Benguela and Malange. The addresses are:—

Associacao Comercial de Luanda,
Caixa Postal No. 1275, Loanda
Associacao Comercial,
Caixa Postal No. 40, Nova Lisboa
Associacao Comercial da Huila,
Caixa Postal No. 28, Sa da Bandeira
Associacao Comercial, Industrial e Agricola,
Caixa Postal No. 36, Mossamedes
Associacao Comercial do Lobito,
Caixa Postal No. 84, Lobito
Associacao Comercial de Benguela,
Caixa Postal No. 18, Benguela
Associacao Comercial, Industrial e Agricola
do Planalto de Malange, Malange

According to the Special Register Information Service, Export Services Branch, Board of Trade, the firm of Pearey Lal & Sons (East Punjab) Ltd., Kashmere Gate, Delhi, has informed the United Kingdom Trade Commissioner at Delhi that it is interested in representing United Kingdom Manufacturers of the following railway stores and mechanical and electrical equipment:—

Railway Requirements

Seamless steel tubes for locomotive boilers
Superheater flue tube for locomotive boilers
Wire ropes
Train lighting switchgear
Train lighting batteries
Train lighting dynamos

Mechanical and Electrical Equipment

Machine tools
Heavy steel chains for shipyards, etc.
Water meters
H.T. insulators
Tool steel: (i) Oil hardening and non-shrinking steel; (ii) Die steel

Most of the items concerned are from time to time the subject of calls for tender put out by the Director General of Supplies & Disposals, New Delhi, and it is largely with this in mind that the firm is anxious to obtain agencies for them.

The firm was established in 1911, receiving its present title in 1948. Its headquarters is normally at Ambala, but the company is administered from Delhi. Manufacturers interested should write direct to the firm, giving full details of their offers. If they will send copies of the initial correspondence to the United Kingdom Trade Commissioner, Eastern House, Man Singh Road, New Delhi, it will enable the enquiry to be pursued on their behalf.

Notes and News

Workshop Foreman, Foundry, Required.—A workshop foreman, foundry, is required by the Nigerian Railway, for one tour of 12 to 24 months in the first instance. See Official Notices on page 644.

Vacancy for Assistant Civil Engineer.—An assistant engineer is required for consulting engineer's design office in London. Applicants should be good draughtsmen and have railway way and works experience. See Official Notices on page 644.

Design Engineer/Draughtsman Required.—Old-established designers and suppliers of railway equipment require at Midland works a design engineer/draughtsman to develop new projects for British and Overseas railways. See Official Notices on page 644.

Vacancy for Civil Engineer.—A qualified civil engineer, not over 45 years of age, with knowledge of survey work, and some knowledge of railway, and/or road location, is required for the London office of an overseas mining company. See Official Notices on page 644.

Vacancy for Assistant Locomotive Superintendent.—Applications are invited for the post of assistant locomotive superintendent, between 26 and 40 years of age, required by the Nigerian Railway, to assist the district superintendent (locomotive) in the general administration of a district. See Official Notices on page 644.

Hoffman Manufacturing Co. Ltd. New Stockroom.—The Hoffman Manufacturing Co. Ltd., makers of ball and roller bearings, have opened a new stockroom at 30, West Annandale Street, Edinburgh, 7. The telephone number is Edinburgh Bypass 3942.

Railway & Canal Historical Society.—Membership of the newly-formed Railway & Canal Historical Society is reported to be increasing steadily. The first meeting will be held at the London Transport Executive Library, 55, Broadway, S.W.1, at 6 p.m. on January 15. This will be followed at 7 p.m. by a talk, "The London & Greenwich Railway: the First Railway in London," by Mr. H. A. Vallance.

Road Haulage Disposals.—The British Transport Commission and the Road Haulage Disposal Board announce that List No. S3 of transport units will be published on December 8. It will consist of some six to eight units which are being re-offered as quickly as possible. Included in the list are units with premises at Accrington, Howgate, Manchester, Smethwick, Stafford, and Uttoxeter. The closing dates for tenders will be January 5, 1955 for vehicle only units, and for units with premises, January 12, 1955.

The Southern Railway Dramatic Society's Autumn Production. — On Tuesday, November 16, the Southern Railway Dramatic Society presented its 24th production "The Holly and the Ivy" by Wynyard Browne, at the Scala Theatre, London. Among the large audience were Sir John Elliot, Chairman, London Transport Executive; Mr. W. P. Allen, Chief of Establishment & Staff, British Transport Commission; Mr. C. P. Hopkins, Chief Regional Manager, Southern Region; and the chairman of the society, Mr. H. C. Lang. In the cast were Mr. Eric Simons,

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who took the part of the Rev. Martin Gregory, Miss Sylvia Smith, who played Jenny, and Miss Rosemary Mason, Aunt Lydia. In addition to the show at the Scala Theatre, performances of each production are given at villages and Institutions in Surrey, Sussex and Kent, raising money for charitable purposes and giving entertainment to patients in hospitals.

Railwaymen's New Club at Bushbury.—British Railways, London Midland Region, Staff Association is to build for the 300 members of the Bushbury (Wolverhampton) branch of the Association a new clubhouse containing a concert room, billiard room, lounge and bar. The foundation stone will be laid on December 8 by Mr. S. B. Lovegrove, District Operating Superintendent, Liverpool, President of the branch, and Mr. C. W. Miller, District Motive Power Superintendent, Bescot, Vice-President. The London Midland Staff Association at present has an all-Region membership of over 16,000.

Diesel Trains in Operation in Cumberland.—British Railways, London Midland Region, introduced two-car diesel trains between Carlisle and Silloth commencing on November 29, and on January 3 similar units will be introduced on the Workington-Penrith-Carlisle service. Journey times will be cut by up to 20 min. The two-car sets were described and illustrated in our May 7 issue.

Fell Locomotive Back in Service.—No. 10100, the Fell diesel-mechanical locomotive, the only one of its type in Britain, has gone into service again on Derby-Manchester passenger trains after an absence of 16 months. The locomotive first made its appearance in January, 1952, but was withdrawn later for modification and general trials. It was described in our issue of June 1, 1951.

Return of Queen Elizabeth, the Queen Mother.—The accompanying illustration shows Queen Elizabeth the Queen Mother, with the Duke of Cornwall and Princess Margaret, after arrival at Waterloo on November 24 of the Royal train conveying Her Majesty from Southampton Docks, en route from the U.S.A. and Canada. She is seen shaking hands with Mr. C. P. Hopkins, Chief Regional Manager, British Railways, Southern Region. On his left is Sir John Benstead, Deputy Chairman, British Transport Commission, and on his right Mr. B. H. Russell, Director, Cunard Steam-ship Co. Ltd., and (extreme left of picture) Mr. L. Cox, Stationmaster, Waterloo.

At Waterloo on November 24, after arrival of the Royal train from Southampton conveying Queen Elizabeth the Queen Mother

The Railway Club Annual Dinner.—The annual dinner of the Railway Club was held at the Danish Club, London, S.W.1, on November 26, with Mr. Kenneth Brown, President, in the chair. There was an attendance of nearly 60 members and guests. The toast of "The Officers and Committee" was proposed by Mr. M. D. Greville; Mr. H. A. Vallance, Honorary Steward, responded. That of the guests was proposed by Mr. Lambert H. Bailey and the response was by Mr. F. D. Y. Faulkner, Public Relations Officer, British Railways, Southern Region.

International Nickel Co. of Canada Ltd.—The interim report of the International Nickel Co. of Canada Ltd. for the nine months ended September 30, 1954, shows net earnings, in terms of U.S. currency, of $14,844,376 for the third quarter and $47,430,561 for the nine months. This was after all charges, depreciation, depletion, taxes, and so on. After satisfying preference dividends, this was equivalent to 99 cents per share of common stock for the quarter and $3·15 for the nine months. Net earnings for the first nine months of 1953 were $41,252,680.

Paris Intercontinental Transport Club.—The advent of the New Year will be celebrated at the Intercontinental Transport Club, 11 Rue de Milan, Paris, 9e, on December 31, in the customary manner. The cost of tickets, including champagne supper, is 1,500 fr. per person. The club is now in its seventh year of existence. The year ended October 31 is reported to have been successful in every respect, including that of social activities, amongst which was the fifth annual gala, "La Nuit de la Locomotions," in March. The amenities offered by the club include a train and theatre reservation service.

Rail Grinding Train.—In the article in our November 5 issue it is stated on page 520 that the height or depth of corrugations is ·0136-·0157 in., and later, on the same page, that the speed of the run over can be increased to about 1·8 m.p.h., allowing for a grinding depth of about ·0015 in. In explanation of the apparent discrepancy between ·0157 in. and ·0015 in., we are informed by Fried. Krupp Lokomotivfabrik, builders of the grinding train, that each grinding wheel removes ·0015 in. off the rail at each run over. Each of the three grinding cars in the train incorporates four grinding wheels, or 12 wheels in all for either rail; therefore one run over at 1·8 m.p.h. would remove 12 × ·0015 in., or 018 in., from either rail.

Pullman Car Co. Ltd. Results.—A dividend of 15 per cent (the same as for the previous year) is announced by the Pullman Car Co. Ltd. for the year ended September 30, 1954. The net profit was £73,197 (£69,906), after deduction of tax of £87,500 (£79,800) and other charges. Provisions no longer required amount to £12,244 (nil). The amount carried forward is £210,172 (£157,797).

Air Fares to be Increased.—Subject to Government approval, British European Airways will increase fares on external services, with some exceptions, from April 1, 1955. The exceptions are the fares from London to Athens, Beirut, Cairo, Copenhagen, Gibraltar, Istanbul, Malta, Cyprus, Oslo, Stockholm, and Tripoli. Bookings made for any route before March 2 will be at the present fares if the journey begins before May 2. The increases, of 5-10 per cent, are the result of a decision taken at a recent conference of the International Air Transport Association. The London-Paris return fare, now £13, will be £13 16s. when the increases come into effect.

Institute of Transport: East Midlands Section Annual Dinner.—The annual dinner of the East Midlands Section of the Institute of Transport took place on Friday, November 19, at the Victoria Station Hotel, Nottingham. Sir John Benstead, a Vice-President and Deputy Chairman, British Transport Commission, deputising for the President, Sir Gilmour Jenkins, responded to the toast "The Institute of Transport," proposed by Air Commodore W. C. Cooper. The toast "The City of Nottingham" was proposed by Lt.-Col. A. Forester Fielding, and response was given by the Lord Mayor of Nottingham, Councillor S. Hobson. Councillor S. W. Bridges, Chairman of Leicester City Transport Committee, responded to the toast of "The Guests," proposed by the Chairman of the Section, Mr. Raymond Tuft, who presided.

International Sleeping Car Share Trust Limited.—The report of the directors of the International Sleeping Car Share Trust Limited for the year ended May 31, 1954, states that as the Wagons-Lits Company paid a dividend on its ordinary shares for 1953 of 3 per cent, compared with 5 per cent for the preceding year, the company had received £11,627 in dividends on its Wagons-Lits holding. Net profit is £6,669, and credit balance to be carried forward, £54,819. A memorandum received from the general manager of the Wagons-Lits Company states that profits of the Wagons-Lits Company for 1953 were less than in the previous year. For the most part this drop was attributable to the fall in traffic during the second half of 1953 which was worsened by the railway strike in France. A favourable factor intervened during the course of the financial year in that negotiations on the question of war damages in Italy reached a satisfactory settlement. An agreement was made last Spring with the French National Railways whereby an average reduction of 20 per cent on the price of Wagons-Lits supplements in France was agreed. A similar arrangement

was made with the Swiss Federal Railways. The Company also reached an agreement with the German railways implementing under satisfactory conditions a reduction of sleeping car supplements on the German railways. The Wagons-Lits Company passed an order to Italian industry for 30 sleeping cars of stainless steel with 20 individual second class compartments of the same type as the 50 cars ordered in France and Belgium. It is also developing refreshment services in the cars.

Railway Staff Negotiation Bodies.—The offices of the Railways Staff Conference, the Railway Staff National Council, and the Special Joint Committee on Machinery of Negotiation for Railway Staff, have been transferred from Waterloo Station, London, S.E.1, to Clive House, Petty France, S.W.1. The new telephone number is Abbey 6131.

Railway & General Engineering Co. Ltd.—The directors of the Railway & General Engineering Co. Ltd. have now sent a letter to shareholders explaining why they oppose acceptance of the offer of H. J. Baldwin & Co. Ltd. to purchase the whole of the 25,000 £1 5½ per cent cumulative preference shares at a price of 20s. per share and the whole of the 750,000 2s. ordinary shares at a price of 4s. per share. It is stated that benefits from the careful planning of the last five years are only now beginning to appear in improved turnover and profits. Still greater prosperity with further benefit to shareholders is expected. Interim accounts prepared for the six months ended September 30, 1954, show a net profit, after all charges but before taxation, which is substantially higher than for the same period of last year.

Sir Brian Robertson in the North Eastern Region.—Sir Brian Robertson, Chairman of the British Transport Commission, on a recent visit to the North Eastern Region, where he met members of the staff of British Railways and other transport undertakings of the Commission, also representatives of local commerce and industry, attended the annual boxing match at York between British Railways, N.E. Region, and the Army Northern Command. Also present at the match were Lt.-General Sir Geoffrey Evans, G.O.C.-in-C., Northern Command; Major-General P. H. de Havilland; Mr. H. A. Short, Chief Regional Manager, North Eastern Region; Mr. W. P. Allen, Chief of Establishment & Staff, B.T.C. The results was a draw, either side winning six bouts. The accompanying illustration shows Sir Brian Robertson presenting a prize to Lengthman W. C. Woods (light welterweight).

Traveller's Gift to Railway Fund.—As a goodwill gesture from a regular traveller and an expression of his admiration for railway workers generally, Mr. David M. Evans Bevan, of Neath, has sent a cheque for £1,000 to Mr. K. W. C. Grand, Chief Regional Manager, for the Western Region "Helping Hand," Fund. This fund is for helping railway staff and their dependants in cases of need or distress. The present donation is only one of many generous gifts that Mr. Evans Bevan has made.

London Traffic Congestion.—Some facts and figures about passengers using public and private means of reaching the centre of London were given recently by Mr. D. McKenna, Chief Commercial & Public Relations Officer, London Transport Executive, in a recent letter to *The Times*. A single new tube railway, he says, would have a capacity of approximately 12,500 seated passengers an hour in each direction. With the addition of passengers standing in reasonable comfort this capacity would be doubled. He estimates the total number of people travelling into the central area of London by private car throughout the whole day to be 130,000. The corresponding number travelling by public transport is 1,800,000.

Crompton Parkinson Limited.—The trading surplus of Crompton Parkinson Limited for the year ended June 30, 1954, amounted to £2,015,801 after deducting depreciation, directors' emoluments, and interest. This compared with £1,884,509 for the previous year. After adding income from investments and deducting tax and transfers to reserves, the consolidated net income was £838,175 (£662,713). Of this, £764,125 (£598,410) accrued to the parent company. A final ordinary dividend of 7½ per cent is recommended, plus a special cash bonus of 7½ per cent. This is the same as in the previous year and absorbs £255,465 (same). The unallocated surplus is £308,264 (£360,825). Net cash available to the group, after deducting a fixed loan of £398,406, was £1,034,213, compared with a net overdraft of £731,086 in the previous year. In his circulated speech, Mr. Albert Parkinson, the Chairman, says that market conditions abroad are better, but there is increasing competition. Conditions at home, he thinks, are also improving.

John I. Thornycroft & Co. Ltd.—The annual general meeting of John I. Thornycroft & Co. Ltd., was held in London recently. Sir John E. Thornycroft, Governing Director & Chairman, presiding, said that the profit of the group had increased by £139,880 over the average of the three preceding years. The increase in cash would be needed for capital expenditure and stocks to produce new types of chassis and engines now being developed, quite apart from the pressure in the export market to grant extended payments to distributors and customers.

Sir Brian Robertson making a presentation after the boxing match between British Railways, North Eastern Region, and the Army Northern Command

Forthcoming Meetings

Until end of year.—"Popular Carriage" Exhibition (Two centuries of carriage design for road and rail) in the Shareholders' Meeting Room, Euston Station, London, N.W.1. Weekdays 10 a.m. to 7 p.m.; Sundays 2 to 7 p.m.

December 6 (*Mon.*).—Society of Engineers, in the apartments of the Geological Society, Burlington House, London, W.1, at 5.30 p.m. Paper entitled "Aluminium as a bridge material," by Mr. Cedric Marsh.

December 6 (*Mon.*).—Institute of Transport, Metropolitan Section, at 80, Portland Place, London, W.1, at 6 p.m. Annual general meeting followed by paper on "Express coach services in Great Britain and on the Continent," by Mr. R. G. James.

December 6 (*Mon.*).—Institute of Transport, Sussex Group, at the Arlington Hotel, Brighton, at 6.30 for 7 p.m. Paper on "Staff training and promotional work," by Mr. Alex. J. Webb.

December 7 (*Tue.*).—Institute of Transport, North Western Section, at the Chartered Accountants' Hall, Manchester, at 6 p.m. Paper on "Current operating problems," by Mr. J. B. Burnell.

December 8 (*Wed.*).—Institution of Railway Signal Engineers, at the Railway Institute, York, at 5.30 p.m. Paper on "Cable manufacture," by B. I. & C. Cable Company.

December 8 (*Wed.*).—Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, 1, Birdcage Walk, London, S.W.1, at 5.30 p.m. Paper entitled "Materials used in locomotive, carriage and wagon construction," by Mr. A. Turner.

December 8 (*Wed.*).—Railway Students' Association, at the London School of Economics and Political Science, Houghton Street, London, W.C.2, at 6.15 p.m. Paper on "Development of forms of motive power," by Mr. R. F. Harvey.

December 9 (*Thu.*).—Institution of Electrical Engineers, at Savoy Place, London, W.C.2, at 5.30 p.m. Paper on "A brushless variable-speed induction motor," by Professor F. C. Williams and Mr. E. R. Raithwaite.

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December 10 (*Fri.*).—Institution of Railway Signal Engineers, at the Institution of Electrical Engineers, Victoria Embankment, W.C.2, at 6 p.m. Paper on "Loudspeakers in marshalling yards," by Mr. B. W. Flexman.

December 10 (*Fri.*).—Institute of Transport, Northern Section, at the Royal Station Hotel, Newcastle, at 7 p.m. Annual dinner and visit of the President.

December 11 (*Sat.*).—Permanent Way Institution, East Anglia Section, at Ipswich, at 2.15 p.m. Discussion on length marking.

December 11 (*Sat.*).—Stephenson Locomotive Society, North Eastern Area, in the Conservative Association Rooms, 2, Jesmond Road, Newcastle-upon-Tyne, at 6.30 p.m. Photographic competition and exhibition.

December 13 (*Mon.*).—Institute of Transport, in the Jarvis Hall (R.I.B.A.), 66, Portland Place, London, W.1, at 5.45 p.m. Henry Spurrier Memorial Lecture "Road haulage—a re-appraisal," by Mr. G. W. Quick Smith.

December 14 (*Tue.*).—South Wales & Monmouthshire Railways & Docks Lecture & Debating Society, at the Angel Hotel, Westgate Street, Cardiff, at 6.30 p.m. Paper on "The manufacture and uses of cement," illustrated by lantern slides, by Mr. A. M. C. Jenour, Chairman of the Aberthew & Bristol Channel Portland Cement Co. Ltd.

OFFICIAL NOTICES

The engagement of persons answering Situations Vacant advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 *inclusive or a woman aged* 18-59 *inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order,* 1952.

EXPERIENCED qualified civil engineer, age not over 45, with knowledge of survey work and preferably some knowledge of railway and/or road location required for London office of Overseas Mining Company. Position pensionable. Write, with full particulars, stating salary required to Box NV/144, c/o Bishopsgate, E.C.2.

ASSISTANT CIVIL ENGINEER wanted for Consulting Engineers' design office in London. Applicants should have passed or be exempt from Parts I and II of the A.M.I.C.E. examination and must be good draughtsmen. They must also have "railway way and works" experience. Apply by letter with full particulars of age, qualifications and experience to Box No. 8169, c/o Charles Barker & Sons Ltd., 31, Budge Row, London, E.C.4.

TRAFFIC ASSISTANT required for Guaqui La Paz Railway (Bolivia). Qualifications required: previous training in Railway Traffic Department or Transportation Company. Active and of first-class health. Age 25/35 years. Preferably single. Knowledge of Spanish most desirable or willingness to learn within six months. Future prospects for right man willing to take opportunities.—Apply Secretary, Peruvian Corporation Limited, 144 Leadenhall Street, London, E.C.3.

OLD-ESTABLISHED designers and suppliers of Railway Equipment require at their Midland Works Design Engineer/Draughtsman to develop new projects for British and Overseas Railways. Practical knowledge of Locomotive, Carriage and Wagon design and service requirements advantageous. Replies will be treated in strict confidence and should give details of age, experience and qualifications. Box 437, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

WORKSHOP FOREMAN (FOUNDRY) required by NIGERIAN RAILWAY for one tour of 12/24 months in the first instance. Appointment (*a*) on temporary terms with salary (including expatriation pay) in scale £807 rising to £1,115 a year; gratuity at the rate of £100/£150 a year; or (*b*) with prospect of pensionable employment with salary (including expatriation pay) in scale £750 rising to £1,035 a year. Outfit allowance £60. Liberal leave on full salary. Free passages for officer and wife. Assistance towards cost of children's passages or grant up to £150 a year for their maintenance in the United Kingdom. Candidates should have served an apprenticeship preferably with the foundry of a Railway or Loco. builder on both ferrous and non-ferrous castings and have had seven years' subsequent experience of heavy foundry work including sand treatment, machine moulding and Fettling plant with at least two years in charge of other workmen. Prospects of promotion to Senior Workshop Foreman. Training and experience in Pattern Making is very desirable. Write to the Crown Agents, 4, Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M2C/40471/RA.

FEDERAL GOVERNMENT OF NIGERIA. Assistant Locomotive Superintendent (BCD. 110/14/03): Nigerian Railway. To assist the District Superintendent (Locomotive) in the general administration of a District. Responsible for maintenance of locomotives and inspection of steam pumps used in connection with water supplies. Appointment is either pensionable or on contract in the scale £730 × £40—£1,290 per annum, with addition of 20 per cent for contract appointment. An expatriation allowance varying between £180—£350 per annum is also payable. On contract appointment a gratuity of £100—£150 per annum is payable on satisfactory completion of contract. Free first-class passages for officer and his wife, and an annual maintenance allowance or free passage allowance up to £75 each is payable in respect of a maximum of two children. Furnished quarters available at rental charge of 10 per cent of basic salary. Leave is granted at rate of seven days for each month of residential service after tour of 18-24 months. Candidates should be between the ages of 26-40 years and be A.M.I.-Mech.E. or have taken Parts A and B of the examination for Associate Membership and be prepared to qualify during probation. Candidates should have served an apprenticeship and pupilage in a first-class Locomotive Repair Workshop and thereafter have had footplate and Running Shed experience, and have worked at least two years on administrative duties in a Locomotive Running Department. Drawing office experience an advantage. Opportunities for rapid promotion in the higher ranks of Nigerian Railways are good. The progressive growth of traffic and the wastage in senior posts due to normal retirements combine to give excellent opportunities for advancement to men of approved worth. Apply in writing to the Director of Recruitment, Colonial Office, Great Smith Street, London, S.W.1, giving, briefly, age, qualifications and experience. Mention the reference number BCD. 110/14/03/D15.

RAILWAY MATERIAL. Plain Sleepers, Chaired Sleepers. Rails of all Sections. Crossing Timbers. We undertake the supply and laying of all classes of siding installations.—The Railroad Plant Supplies Co. Ltd., 13 Waterloo Road, Wolverhampton. Telephone No. Wolverhampton 23617.

TENDERS are invited for the supply of 20 Main Line Diesel Electric Locomotives to the New Zealand Government Railways. Copies of Specification will be supplied on request to the High Commissioner for New Zealand, 415, Strand, London, W.C.2. The lowest or any tender will not necessarily be accepted. Tenders will close at the office of the Comptroller of Stores, New Zealand Railways, Private Bag, Wellington, New Zealand, at 4.0 p.m. on Thursday, December 30, 1954.

BOUND VOLUMES.—We can arrange for readers' copies to be bound in full cloth at a charge of 25s. per volume, post free. Send your copies to the SUBSCRIPTION DEPARTMENT, Tothill Press, Limited, 33, Tothill Street, London, S.W.1.

Railway Stock Market

Stock markets were a little unsettled at the beginning of the week when British Funds turned easier because of talk of a possibility of dearer money and an increase in the bank rate. Opinions are divided, but the suggestion that the bank rate might be increased was enough to affect sentiment and put British Funds lower. There was very little selling in evidence, and prices tended to firm up later. The trend in gilt-edged stocks influenced that in the industrial and other sections of markets, where buying interest was reduced because funds are being kept in reserve for the further important new issue expected during the next few weeks

Foreign rails were featured by activity and strength of Antofagasta stocks under the influence of Mr. H. C. Drayton's reference at the recent annual meeting to the possibility of a £500,000 distribution from a subsidiary, which would enable payment of dividend arrears on the preference stock to be accelerated. In response to this prospect, Antofagasta preference stock has advanced to 58, which compares with 48½ a week ago, while the ordinary stock rose from 9¼ to 11½. The market view is that, looking ahead, both stocks should be worth well over their current levels, and that for some time to come they are likely to remain the most active stocks in the foreign railway market. Antofagasta debentures were higher with the 6 per cents gaining a point at 58½.

Activity in Canadian Pacific stocks quietened down a little, but recent big gains in the preference stock were not fully held, the quotation being $75 compared with $76¼ a week ago. The 4 per cent debentures moved fractionally lower at £91¼, while the ordinary shares, at $54, were higher on balance. White Pass no par value shares eased from $38¾ to $37, but remained active.

There were again few dealings in Midland of Western Australia but the quotation remained at 22½, while the first debentures kept at 92½ and the second debentures at 42.

Nyasaland Railways shares moved up from 5s. 9d. to 6s. 3d., and the 3½ per cent debentures were again 79½.

Application is being made for a London quotation for the Rhodesia Railways Trust £450,000 of 4½ per cent first debenture stock (1978-83). Dealings are expected to start on Monday at a round 102. In the past the company's assets were very largely its holding of shares in Rhodesia Railways, but in 1947, these shares were sold to the Government of Southern Rhodesia. Since then, the company has been an investment trust.

Among Indian stocks, Barsi kept at 92½, but the quotation was apparently again untested by dealings. There were a few dealings in United of Havana issues, but quotations were the same as a week ago, with the income stock at 35¾ and the consolidated stock 5.

Taltal Railway shares were again 14s. 6d. and Nitrate Rails shares remained at 19s. 3d. Peruvian Corporation preference stock moved lower again at 7, while the debentures came back from 59½ to 58¼. Guayaquil and Quito first debentures remained at 59 and Paraguay Central 6 per cent debentures at 20½. Brazil Railway bonds were again at 7½ and San Paulo units at 3s. 4½d.

Road transport shares continued firm with Southdown at 34s. 9d., Lancashire Transport 62s. and West Riding 33s. 9d., B.E.T. "A" deferred 5s. units changed hands around 21s. 1½d.

There was less activity in shares of locomotive builders and engineers, but recent gains were generally maintained, though Beyer Peacock came back from 49s. 9d. to 49s., Vulcan Foundry remained at 30s. 3d., and Wagon Repairs 5s. shares kept their rise to 17s. 9d. Charles Roberts 5s. shares, too, have been well maintained at 9s. 3d. At Birmingham, Birmingham Carriage moved up from 34s. 4½d. a week ago to 35s. 7½d. on hopes of higher dividend prospects. G. D. Peters were 26s. 3d., while in other directions, Gloucester Wagon 10s. shares gained 6d. at 18s. 6d. North British Locomotive again changed hands around 18s. Elsewhere, Associated Electrical were active around 61s. 3d. after news of negotiations by the company for acquisition of the ordinary shares of Siemens Brothers.

Most engineering shares recorded small uncertain movements, but buyers continued in evidence for Tube Investments, which rose further to 81s. Guest Keen eased to 68s. 6d. T. W. Ward have been steady at 60s. 6d. after it was known that the company had re-acquired its former steel interests. Steel shares became less active, and the premium on Dorman Long which was up to 1s. 6d. following the start of dealings, later eased to 1s. 3d.